DASSAULT SYSTEMES

3DEXPERIENCE® MODELING & SIMULATION CONFERENCE

NOVEMBER 17-18, 2020 | GLOBAL VIRTUAL EVENT

Conference Agenda

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About the Event

This year's Global **3D**EXPERIENCE Modeling & Simulation Conference will be held virtually on November 17-18. We hope the conference will inspire our users to design and innovate the next generation of products by offering learning opportunities through user presentations on industry applications, product and technology updates, as well as connecting with other users and representatives from Dassault Systèmes.

The conference will be held in two time zones – one for Asia and Europe and one for Europe and Americas.

Conference Start Times:

Europe / Asia Pacific
- London | 7AM-10AM
- Paris & Rome | 8AM-11AM
- Madrid | 8AM-11AM
- Singapore | 3PM-6PM
- Beijing | 3PM-6PM
- Tokyo & Seoul | 4PM-7PM

Americas / Europe
- San Francisco | 8AM-11AM
- Chicago | 10AM-1PM
- Boston | 11AM-2PM
- Sao Paulo | 1PM-4PM
- London | 4PM-7PM
- Paris & Rome | 5PM-8PM

Overview

Each day consists of 2 hours of streamed content, plus additional on-demand content to be viewed at your leisure. See time zones to find when the conference starts in your time zone.

Use the 'Build Your Own Agenda' function to search by discipline, topic, industry or brand to create your own playlist of presentations to watch.

Tuesday, November 17, 2020	Wednesday, November 18, 2020
Plenary *Live - 1 hour*	**Plenary** *Live - 1 hour*
Live Meetings *Live - 1 hour*	**Technology Updates and Live Q&A with R&D** *Live - 1 hour*
Breakout Sessions *Watch at your leisure* **Chat Rooms** *Available all day after plenary ends* Join in live topical discussions with other users and subject matter experts in the Design & Modeling Community or the Simulation Community. **Expo Hall** *Available all day after plenary* • Sponsor booths • **3D**EXPERIENCE Playground	

Register

Agenda

Tuesday November 17, 2020

Plenary - *1 hour*

Hear from our customers and Dassault Systèmes executives

Title	Presenter
Welcome	Philippe Laufer, *Executive Vice-President, 3DS Global Brands*
Modeling & Simulation: A Perfect Union of Form and Function on the 3DEXPERIENCE Platform	Olivier Sappin, *CEO CATIA* & Eric Bienvenu, *Vice President Global Sales, SIMULIA* **Abstract:** Join our executives as they explain how continuous integrated Modeling & Simulation together on the digital 3DEXPERIENCE platform enables our customers to break down silos to improve collaboration, minimize risk, maximize ROI, supercharge designers and accelerate sustainable innovation
Customer Keynote: The Transition to 3DEXPERIENCE, An Aerospace Simulation Perspective	John Vandeventer, *Associate Technical Fellow, Boeing* For bio & abstract see page: 9
Modeling & Simulation Showcase: eDrive MBSE Demo	Gregor Judex, *SIMULIA Industry Consultant Director* **Abstract**: Modeling & Simulation Showcase: eDrive MBSE Demo Connecting the dots between requirements, design and simulation is the key aspect of MODSIM and the foundation for the development of complex systems. Digital continuity allows the physical behavior of the final product to be virtually evaluated and optimized across multiple domains. These aspects shall be demonstrated within the 3DEXPERIENCE platform by the example of an electric drive development cycle. The engineering typically starts from high-level requirements, which are going to be refined by running 1D simulation models. This information will then be used to create the detailed geometry, which is the basis for multi-physics simulation. Associativity between CAD and CAE and the orchestration of simulation process will help to easily run loops to optimize the geometry of this complex system until the detailed requirements are validated successfully.

Register

Live Meetings - *1 hour*

For SIMULIA users, we are delighted to announce our SIMULIA Regional User Meeting within the Global 3DEXPERIENCE Modeling & Simulation Conference. Connect with users and Dassault Systèmes executives in your local user community.

USER MEETINGS	LANGUAGE
Japan Regional User Meeting	Japanese
China Regional User Meeting	Chinese
ASEAN South Regional User Meeting, including Singapore, Malaysia, Australia, New Zealand, Philippines, Thailand, Vietnam and Indonesia	English
EuroNorth Regional User Meeting, including UK, Denmark, Norway and Sweden	English
EuroWest Regional User Meeting (France)	French
EuroWest Regional User Meeting (Spain)	Spanish
EuroMed Regional User Meeting, including Italy, Turkey, Israel, Balkans, Greece and Slovenia	English
North America Regional User Meeting, including United States, Canada and Mexico	English
Brazil Regional User Meeting	Portuguese

We are also pleased to announce the following **CATIA sessions:**

- **Requirements Engineering in context of Model Based Systems Engineering**
- **Simulation for Designers**

Register

Wednesday, November 18, 2020

Plenary - *1 hour*

Hear from our customers and Dassault Systèmes executives

Title	Presenter
Welcome	Olivier Sappin, *CEO CATIA* & Eric Bienvenu, *Vice President Global Sales, SIMULIA*
Modeling & Simulation R&D Portfolio and New Applications	David Holman, *Vice President, SIMULIA R&D &* Romain Perron, *Senior Director, CATIA Design & Engineering R&D Applications* **Abstract:** Join our R&D executives to discover how designers and engineers are empowered to achieve sustainable innovation through streamlined modeling and simulation processes from requirements to certification using unified solutions from CATIA and SIMULIA on the **3D**EXPERIENCE platform.
Customer Keynote	Dr. R. Byron Pipes, *Purdue University* For full bio & abstract see page 10
The Key Role of Modeling & Simulation in the Fight Against the Pandemic	Adrien Mann, *Director, SIMULIA Worldwide Industry Process Success;* Liangbo Hu, *China Industry Process Consultant;* Gregory Laskowski, *SIMULIA Fluids Industry Process Expert Director* **Abstract:** In the first half of 2020, the global pandemic shook the world through the extent and the speed at which the disease spread globally. In these critical times, having the ability to quickly come up with product designs effective at slowing down the virus propagation, and most importantly, at saving lives, becomes essential. In this session, learn how modeling & simulation has enabled, and will continue enabling, the fast design of critical products and the improvement of our environments to fight against the pandemic. Specifically, learn: • How field hospitals have been designed to ensure proper extraction of airborne contaminants and how modeling and simulation can accelerate the process; • How ventilators have been efficiently designed for a production everywhere anywhere in record time to support hospitals overwhelmed with severally-ill patients; • How our modeling and simulation solutions for HVAC equipment will enable a future where Indoor Air Quality (IAQ) is key for our everyday well-being and safety.

Technology Updates and Live Q&A with R&D - *1 hour*
Learn about key changes to our software on the following topics:

- CATIA 21x Updates
- Structures
- Fluids Portfolio
- Electromagnetics
- Multibody Dynamics
- Vibro-Acoustics & Noise
- Multiphysics/Electrification/Battery
- Simulation Process Automation and Design Exploration

On Demand

Breakout Sessions

Watch at your leisure
Watch on-demand presentations from our users and Dassault Systèmes technology experts at your leisure. Search by topic or technology or build your own agenda with over 100 presentations from around the world on multiple topics, including:

- Cyber Physical Systems (MBSE)
- Concept Structure Engineering
- Light Weight Engineering
- Design with Integrated Modeling & Simulation
- Modeling & Simulation from an Industry Perspective
- Enhanced Performance with Multidisciplinary Modeling & Simulation
- Improve Real-World Performance with Structures Simulation, including Abaqus, fe-safe, Tosca, Isight and 3DEXPERIENCE Structures
- Reveal & Shape with Fluid Simulation, including PowerFLOW, XFlow and 3DEXPERIENCE Flow
- Enabling IoT with Electromagnetics Simulation, including CST Studio Suite, Antenna Magus and Opera
- Multibody Dynamics, including Simpack
- Vibro-Acoustics and Noise, including Wave6 and Fluids technology for Noise Prediction

See the full abstracts on page 42.
Abstract and presenters are subject to change

On-Demand
Watch plenary, Live Meetings and Breakout Sessions at your leisure. Each live session will be available on-demand immediately after the session ends to allow you to watch at times that suits you most!

Network in our Chat Rooms

Available all day after plenary

1. Chat Rooms

Join in live topical discussions with other users and Dassault Systèmes experts on:

- Design & Modeling
- Simulation

Find an Expert

During the event, attendees will be able to easily search for experts and set up a meeting to discuss technical problems using the 'Find an Expert' app.

Keynotes

Boeing, John VANDEVENTER

John VANDEVENTER is an Associate Technical Fellow in the Boeing Commercial Airplanes Structures Engineering Design and Analysis Solutions team. John has worked for Boeing as a Structures Analyst for more than 30 years after graduating from the University of Washington in 1989.

For his entire career, John has used both CATIA (V3 thru V6/3DEXPERIENCE) and SIMULIA (Elfini, Abaqus, 3DEXPERIENCE) applications, becoming a leader in the use of SIMULIA tools to simulate aircraft structure at Boeing. John has also worked closely with Boeing analysts and SIMULIA R&D to ensure that the needs of those who use SIMULIA solutions is communicated with those who provide them. John also was named a SIMULIA Champion earlier this year.

The Transition to 3DEXPERIENCE, An Aerospace Simulation Perspective

In 2016, Boeing began a transition to a fully digital enterprise. Part of this transition, known as 2nd Century Enterprise System (2CES), includes the transformation of our Engineering processes to be Model Based incorporating the concept of a Digital Twin by exploiting Simulation throughout the lifecycle of the products we produce. To facilitate this, Boeing has selected the 3DEXPERIENCE platform to be the basis of its engineering design and analysis toolsets. The 3DEXPERIENCE platform will allow Boeing to break down silos between engineering disciplines allowing collaboration between people, processes, tools and data. As part of the process of transitioning to a digital enterprise, we must first transition the simulation work we do today from our current set of tools to the 3DEXPERIENCE Platform. The breadth of simulations and analysis Boeing will perform in 3DEXPERIENCE range from conceptual loads development to certification analysis to in-service support long after production has

ended. This presentation will provide an overview of the structural simulations and analysis being transitioned to 3DEXPERIENCE at Boeing highlighting the benefits we are realizing, the challenges we face and new opportunities such as support of Additive Manufacturing.

Purdue University, Dr. R. Byron PIPES

Dr. R. Byron Pipes is Executive Director of the Composites Manufacturing and Simulation Center at Purdue University. He was elected to the National Academy of Engineering in 1987 in recognition of his development of an exemplary model for relationships between corporate, academic and government sectors to foster research and education in the field of composite materials. In 2018 at the 150th anniversary of the founding of engineering at University of Edinburgh, he was awarded the honorary Doctorem Honoris Causa by the University of Edinburgh, Scotland.

Modeling & Simulation at the New 3DEXPERIENCE Education Center of Excellence for Advanced Composites

A new joint partnership between Purdue University and Dassault Systémes will allow industry to accelerate the adoption of high performance advanced composites by joining MBSE with modeling & simulation to address real-world composites design and manufacturing challenges that couldn't be solved before. At the new 30,000 square foot (almost 2,800 sq meter) 3DEXPERIENCE Education Center of Excellence in Advanced Composites at Purdue University, both students and career engineers will learn the skills they need to design, validate, and scale for the high production rates needed by industry applications. This presentation will introduce the new center and demonstrate that Modeling & Simulation represents the future of engineering becoming pervasive across industry. With an eye to the future, examples of composites modeling and simulation will be shown illustrating that the siloed approach to design will soon become a thing of the past.

Executive Presenters

Philippe Laufer, Executive Vice President, 3DS Global Brands, Dassault Systèmes

Philippe Laufer became Executive Vice President 3DS Global Brands with responsibility for all Dassault Systèmes Brands in December 2019. Prior to that, he was appointed CATIA VP R&D in 2006 and became CEO CATIA in 2012. His contribution has been crucial to invent and develop the new CATIA on the 3DEXPERIENCE platform. He is unanimously recognized by our partners and customers as the leader to deliver on CATIA's new promise, "Shape the World We Live In," and to carry on the transformation from design thinking to experience thinking thanks to the 3DEXPERIENCE platform. His deep knowledge of the industry has driven many major successful deployments. Philippe also directed all 3D design-related roles for Dassault Systèmes.

Philippe began his career at Dassault Systèmes in 1985 with initial focus on design and manufacturing. After spending two years in Seattle to lay the foundations of the Boeing 777 program, Philippe managed Dassault Systèmes' Automotive Competency Center making our solutions the quasi-de facto industry standard. Through these experiences, Philippe acquired deep knowledge of industries and customers' business processes. He leveraged this expertise to manage the research and development of Dassault Systèmes' shape design and styling solutions and drove these solutions to undisputed leadership.

Philippe earned a degree in mechanical engineering from the "Ecole Centrale de Nantes" in 1983 followed by a Master's degree in production automation from the "Ecole Nationale Supérieure des Techniques Avancées" in 1984 and has a PHD in Systems Engineering. Within and outside his job, he likes climbing unreachable mountains.

Eric Bienvenu, VP Global Sales, SIMULIA, Dassault Systèmes

Eric joined Dassault Systèmes in 2017 as Vice President of **3D**EXPERIENCE platform within the company's SIMULIA brand, and was promoted to Vice President, Worldwide Sales of SIMULIA in 2018.

In order to best serve customers and to contribute to Dassault Systèmes Simulation strategy as part of the **3D**EXPERIENCE platform, Eric leads all Sales, Support, Services and Consulting activities from the SIMULIA Brand. Eric brings more than 27 years of enterprise software experience to his new role. Prior to Dassault Systèmes, he held Sales, Management & Executive positions at several companies, including, Structural Dynamics Research Corporation (SDRC), Tecnomatix and an Executive role at ANSYS Europe for the last 10 years. Eric earned his Master's degree in Computer Science, applied in Robotic and Automation from the University of Compiègne (UTC) in France and completed courses in finance and business strategy at INSEAD.

Olivier Sappin, CEO, CATIA, Dassault Systèmes

Olivier has 24 years expertise in the Transportation & Mobility Industry and 3D Design & End to End Virtual Product / Experience Innovation. Since December 2019, he has held the position of CEO of CATIA at Dassault Systèmes.

Olivier started his career at Dassault Systèmes (3DS) in 1995 in CATIA's Shape Design Industrialization Team. He then joined the 3DS international Automotive Competency Center working with renowned customers like HONDA, FIAT, BMW, CHRYSLER and PSA to help them transform their design practices in the area of car body and styling. Through these experiences, he acquired deep knowledge of the automotive sector and customers' business processes. In 2011, he was appointed Vice President of the new

defined Transportation & Mobility industry, which helps manufacturers and suppliers to develop new mobility experiences for their consumers. He is enjoying his new challenge to lead and represent the prestigious brand CATIA.

David Holman, Vice President R&D and SIMULIA Brand Leader, Dassault Systèmes

David M. Holman is Vice President R&D and SIMULIA Brand Leader at Dassault Systèmes, overseeing all simulation strategy and development. Former entrepreneur and XFlow CEO, David offers almost two decades of experience creating and growing computer-aided engineering solutions, game-changing applied physics technology, and high-value solutions for the industry. He is an aerospace engineer and scientist with contributions to bioengineering and computational fluid dynamics communities. He is also a member of the UKCOMES Industry Advisory Board and supports impact initiatives like the Ocean Cleanup project.

Romain Perron, CATIA Design & Engineering R&D Applications Senior Director, Dassault Systèmes

Gregor Judex, SIMULIA Industry Consultant Director, Dassault Systèmes

Gregor leads the SIMULIA Industry team in Central Europe. He has worked in the field of simulation for 23 years, 15 of them at Dassault Systèmes. Before then he was with Abaqus Inc. Gregor holds a Master of Science degree in Mechanical Engineering from Technical University Vienna.

Adrien Mann, SIMULIA Worldwide Industry Process Expert Director, Industrial Equipment, Dassault Systèmes

Adrien currently leads globally the development, deployment and enablement of simulation solutions for virtual twins for the Industrial Equipment industry (Manufacturing Equipment, Heavy Machinery, Power & Fluidic Equipment, Building Equipment, Tire Manufacturing). In the context of the COVID-19 pandemic, Adrien leads the Create Safe Life Environment through Simulation initiative at Dassault Systèmes where SIMULIA Fluid Solutions are used to model the transport of droplets by airflow from ventilation systems in various environments such as hospitals, aircraft, offices, factories, trains, etc.

In 20011, Adrien joined Exa Corporation's aero-acoustics application management team (acquired by Dassault Systèmes in 2018) where he developed patented technologies enabling the identification of flow noise sources in HVAC systems. He led for 2 years the Cabin Comfort expert group for the Transportation & Mobility industry. He holds a Master of Science in Mechanical Engineering from Stanford University (2011) and a Diplome de l'Ecole Polytechnique in Paris (2009).

Gregory Laskowski, SIMULIA Fluids Industry Process Expert Director, Dassault Systèmes

Dr. Laskowski currently leads the Fluid Mechanics enablement team supporting the development, deployment and enablement of SIMULIA fluid solutions for all industries.

Dr. Laskowski joined 3DS in 2018 after having spent 14 years at GE Global Research and GE Aviation supporting development and deployment of CFD tools and methods for aircraft engine and power generation technology and products. He is an inventor on a dozen patents or pending patents and author on more than 80 peer reviewed articles in these respective industries. He holds a BSc in Aerospace Engineering from Penn State, an MSc in Aerospace Engineering from University of Cincinnati, a Research Masters in Aerospace Engineering from the von Karman Institute for Fluid Dynamics and PhD in Aeronautics and Astronautics from Stanford. He did a PostDoc at Sandia National Labs in Livermore CA focusing on large scale multiphysics, multiscale CFD prior to entering industry. He is active in both AIAA and ASME.

Liangbo Hu, SIMULIA China Industry Process Consultant, Dassault Systèmes

Liangbo directly supports Dassault Systèmes' customers in China on fluids-related projects based on the PowerFLOW and XFlow fluid solvers. Liangbo is an expert in Computational Fluid Dynamics (CFD) simulations across physics domains such as aerodynamics, thermal or aeroacoustics. Prior to joining Dassault Systèmes' SIMULIA, his experience included working at UTRC and Trane where he gained comprehensive skills in turbomachinery design (Fan/Compressor). Liangbo obtained his Master's degree from East China University of Science and Technology in 2015.

Register

Live Talks – November 17

SIMULIA Regional User Meetings

Providing a Local Focus within the Global Conference

We know that a virtual global event can't replace our face-to-face local user meetings. Therefore, as we try to adapt to the new normal, we are bringing your local SIMULIA team and your local simulation friends and peers closer to you. Please join us for this 1-hour LIVE session to focus on the local topics and trends that matter most to you. Ask questions to the SIMULIA team, chat amongst yourselves about the topics raised, and engage. Be part of your simulation community – we're all still here!

Here are details about all of the Regional User Meetings happened during the event. Look for your local meeting!

SIMULIA Japan Regional User Meeting

November 17, 2020

5pm-6pm JST

SIMULIA Japan is delighted to announce its Regional User Meeting within the Global 3DEXPERIENCE Modeling & Simulation Conference.

This session provides an invaluable platform for industry and academia to learn how the latest simulation technology and methods can accelerate and improve product development. Meet and hear your local SIMULIA team and watch presentations about the use of simulation in your region.

Meeting Highlights

- Technology updates showcasing best-in-class SIMULIA technology
- Panel discussion by industry experts on latest trends in simulation
- Voice your opinion to SIMULIA senior management attending the session
- Opportunity for fun and networking with like-minded people and SIMULIA experts

Tentative Agenda

- Welcome Address
- Product Updates
  - Structures
  - Electromagnetics
  - Fluids
  - Multibody Dynamics

Register

Meet the Speakers

Kasugai Satoko, SIMULIA APAC Industry Process Consultant Senior Manager

Since graduating from Tsuda University, where she majored in mathematics and computer science, Kasugai Satoko has worked with many customers from a variety of industries to provide upfront CAE solutions in design-integrated structural simulation for more than 18 years. In her current role, she engages in providing the latest solutions for structural analysis including fatigue and topology optimization to the customers across Asia Pacific.

Dr. Shinya Watanabe, SIMULIA Japan, Industry Process Consultant Senior Specialist

Shinya Watanabe specializes in the high-frequency electromagnetic field domain and has close to 22 years of simulation and R&D experience. In his current role, he provides electromagnetic field analysis solutions to customers. He holds a Doctorate degree in engineering from the graduate school of Aoyama Gakuin University.

Ryo Matsushima, SIMULIA Japan, Industry Process Consultant Specialist

Ryo Matsushima has a Master's degree from the University of Electro-Communications. He developed fuel cell systems through computational fluid dynamics (CFD) simulation at the laboratory of ENEOS Co., Ltd and has worked at Samsung Electro-Mechanics as a fluids and thermal simulation specialist. Matsushima-san joined Dassault Systèmes in 2019, and his focus is on providing support and consulting for thermal management field customers.

Jun Matsui, SIMULIA Japan, SIMULIA APAC Industry Process Consultant Senior Manager

Jun Matsui specializes in the Multibody Dynamics Simulation domain and has close to 19 years of simulation and research experience. In his current role, he engages in providing a state-of-the-art motion analysis solution to customers across Asia Pacific. He holds a Master Degree in Mechanical Engineering from Keio University.

Register

SIMULIA China Regional User Meeting 2020

November 17, 2020

4pm-5pm CHN

SIMULIA China is delighted to announce its Regional User Meeting within the 3DEXPERIENCE Modeling & Simulation Virtual Conference.

Meeting Highlights

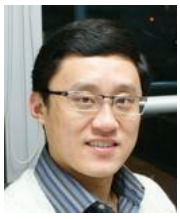
1. Live demonstration of the latest and the best SIMULIA solution
2. Voice your opinion to SIMULIA senior management attending the session
3. Listen to some of the best-in class SIMULIA applications through user presentations
4. Opportunity for fun and networking with like-minded people

Tentative

- Welcome Address
- Technology Trends in Simulation: Simulation driven intelligent design, manufacturing and operation
- User presentation from SIMULIA Champion
- Open House with China SIMULIA experts

Meet the Speakers

Tianfeng JIAO
Sales Director, SIMULIA CHINA
Tianfeng has been with Dassault Systèmes for more than 12 years. He has always focused on the simulation of structures, fluids, heat transfer and optimization domain. He obtained Bachelors of Engineering and Science from Tsinghua University. He has rich experience with aerospace, automotive, energy, consumer goods & packaging industries. Participate in the project initiation of 12-5 and 13-5 major projects of multiple clients such as CASC, CASIC, AVIC, etc.



Barry BAI
Industry Process Consultant Director, SIMULIA China
Barry holds a MSc in Solid Mechanics from Tsinghua University. Since 2003, he has held various positions at Dassault Systèmes, including Senior Application Engineer, Chief Representative of Beijing office, General Manager of China and Director of Asia Pacific Strategy. He is currently responsible for the Industry Process Consultancy team and project management in China SIMULIA with focus on technical areas including modeling and simulation, additive manufacturing, 5G IIoT simulation, living human body, cloud computing, simulation based VR/AR and multiphysics/multiscale simulation technologies.

Register

Presentation title: Technology Trends in Simulation: Simulation driven intelligent design, manufacturing and operation

Abstract: A brief overview on the technology overview to the simulation driven digital twins in the product lifecycle, from design, test, manufacturing and extending to operations. This is enabled by cutting edge technologies such as integrated CAD/CAE/CAM, augmented intelligence, big data, industry internet of thing, cloud computing etc. on 3DEXPERIENCE Platform. Demo videos applicable to industries such as Automotive, Aerospace and Energy will be shown in this presentation.

Biaoneng LUO

Ningbo Geely Automobile Research Institute

Presentation Title： Vehicle High-speed Stability and Aerodynamic Stability

Luo holds a master's degree in aero-engine compressor engineering from Nanjing University of Aeronautics and Astronautics. Worked in CFD for more than ten years since graduation. Successively worked in Chery Automobile, Ansys, Geely Automobile and other companies. Luo joined Geely in 2015 and is currently the head of CFD analysis at Lynk & Co Research Institute of Geely Group. Luo participated in and led the aerodynamic development of a number of models, including popular models such as the Lynk & Co 03 (+), Geomery A, etc.

Presentation title: Vehicle high-speed and aerodynamic stability

Abstract: It is reported that the Hangzhou-Ningbo double line super high-speed, intelligent, interconnected, fast, and reserved for the design of breaking 120KPH. When the vehicle is driving at high speed, passing bridge pillars, or encountering crosswinds, is there a sense of driving insecurity or even safety problems? The high-speed stability of vehicles, especially the high-speed instability caused by aerodynamic factors, is rarely studied in China. This technical exchange, combined with our case, is an inspiration.

Register

SIMULIA ASEAN Regional User Meeting 2020

November 17, 2020

4pm-5pm SGT

SIMULIA ASEAN is delighted to announce its Regional User Meeting within the Global **3D**EXPERIENCE Modeling & Simulation Conference.

This session provides an invaluable platform for industry and academia to learn how the latest simulation technology and methods can accelerate and improve product development. Meet and hear from your local SIMULIA team and watch presentations about the use of simulation in your region.

The session will be led by the SIMULIA ASEAN team and held in English.

Meeting Highlights

1. Interact with other users & SIMULIA experts on simulation technologies
2. Voice your opinion to SIMULIA senior management attending the session
3. Listen to some of the best-in class SIMULIA applications through user presentations
4. Opportunity for fun and networking with like-minded people

Tentative Agenda

- Welcome Address
- From Optimization to Artificial Intelligence: The SIMULIA Technology
- Open House with APSOUTH SIMULIA experts
- Virtual Beer & Closing

Meet the Speakers

Dr. Alan TAN
SIMULIA Sales Director, AP SOUTH
Alan has a doctorate in Civil Engineering and has been with Dassault Systèmes for more than 10 years. His previous role includes technical work and he was the fatigue lead for APAC. Prior to working with DS, he was an academician and researcher as well as a consultant in Oil & Gas and Civil Engineering.

Alwan Venkatakrishnan
Industry Process Consultant Manager, SIMULIA AP SOUTH
Alwan, specializes in Process Automation & Design Exploration domain, has close to 9.5 years of simulation & research experience. In his current role, he engages with customers across industries to cater their optimization needs and to address key performance challenges. Alwan holds a Master's degree by research in Mechanical Engineering from Indian Institute of Technology Madras.

Dr. Brent Fillery

Industry Process Consultant Senior Specialist, SIMULIA AP SOUTH

Brent is a Structural Analyst with a broad and diverse experience base and specialist knowledge in process development and workflow automation, python integration and automation, computational strength and life assessment and a keen interest in digital twin and probabilistic analysis paradigms. He holds a Bachelors of Engineering (Mechanical) and Science (Applied Mathematics) from the University of Western Australia in 2003, followed by a Doctorate with a focus on Computational Fracture Mechanics in 2010. During and immediately following PhD candidature he was part of a multi-disciplinary team developing, enhancing and utilizing Abaqus for multi-scale mine analysis. In Germany and UK, he led analysis teams dedicated to the application of both commercial and propriety FEA codes in support of turbo-machinery technology development for the likes of Rolls Royce, Siemens and MAN Energy Solutions, championing integration of optimization and robust design workflows to drive method enhancements associated with airfoil dynamics, fatigue, fracture and creep analysis. He is based in Perth, Australia, supporting Dassault Systèmes SIMULIA in South East Asia.

Matthias Meienhofer

Industry Process Consultant, SIMULIA AP SOUTH

Matthias holds a Bachelor's Degree in Electrical Engineering and a Master's Degree in Industrial Technologies from Hochschule für Technik Rapperswil in Switzerland. He moved to Singapore in 2016, after completing his Master's Thesis at Nanyang Technological University. After working as an Antenna Designer at a large company within the medical devices sector, he joined Dassault Systèmes Singapore in 2018. Matthias focuses on Electromagnetic Simulation, leading and supporting customer engagements across Asia Pacific South.

Register

SIMULIA EuroNorth Regional User Meeting 2020

November 17, 2020

8am-9am GMT

SIMULIA EuroNorth is delighted to announce its Regional User Meeting within the 3DEXPERIENCE Modeling & Simulation Virtual Conference. This session provides an invaluable platform for industry and academia to learn how the latest simulation technology and methods can accelerate and improve product development. Meet and hear your local SIMULIA team and watch presentations about the use of simulation in your region.

Meeting Highlights

- User presentation showcasing best-in-class SIMULIA technology
- Panel discussion by industry experts on latest trends in simulation
- Voice your opinion to SIMULIA senior management attending the session
- Opportunity for fun and networking with like-minded people and SIMULIA experts

Agenda

- Opening Remarks, Yves Lombard & Jonathan Carter
- 3DEXPERIENCE Cloud for Simulation, Adriano Gagliardi
- Customer Presentation
- Open Q&A, Arjun Rajkumar

Meet the Speakers

Yves Lombard
Geo Leader, SIMULIA EuroNorth
With more than 35 years on FEA software, Yves started his career as one of the 7 founders of Samtech (Siemens), where he spent 16 years in development, technical support, pre-sales and finally sales. After that, he joined MSC Software, where he spent almost 10 years in sales. At Dassault Systèmes for the past 11 years, Yves has spent 3 years at the SIMULIA Europe office in Maastricht as MTA sales manager and then 8 years in EuroWest/EuroMed Cluster and then EuroNorth as Geo Leader.

Jonathan Carter
Industry Process Consultant Director, SIMULIA EuroNorth
Following his PhD (University of Manchester), Jon started his career as an aero- and hydrodynamicist for an America's Cup syndicate (who lost!). In his next role as a scientific officer at a nuclear physics laboratory where he developed algorithms for high performance and parallel computers. Jon then joined the company responsible for developing Abaqus. Over the last 24 years, he has had a variety of roles, including technical support engineer, services engineer and UK Services Manager. His primary interests are in workflow

automation and democratization of simulation. He is now responsible for the EuroNorth SIMULIA Technical Team.

Dr. Adriano Gagliardi
CEng MRAeS, Industry Process Expert, SIMULIA WW 3DEXPERIENCE Enablement
Adriano joined Dassault Systèmes SIMULIA from the Exa Corporation acquisition in 2018, and has more than 12 years of experience in CFD in the T&M, A&D and Motorsport industries. As an Industry Process Expert, Adriano is focused on our 3DEXPERIENCE Cloud offering for all simulation. Adriano has a MEng in Aeronautical Engineering, and a PhD in Computational Aerodynamics from the University of Glasgow.

SIMULIA Spain Regional User Meeting 2020

November 17, 2020

9am-10am CEST

SIMULIA Spain is delighted to announce its Regional User Meeting within the Global 3DEXPERIENCE Modeling & Simulation Conference. This session provides an invaluable platform for industry and academia to meet and hear from the local SIMULIA team and watch presentations about the use of simulation in your region. The session will be led by the SIMULIA EuroWest team, in collaboration with our valued partner PRINCIPIA, and held in Spanish.

Meeting Highlights

1. Live demonstration of the latest SIMULIA solutions
2. Voice your opinion to SIMULIA senior management attending the session
3. Listen to some of the best-in class SIMULIA applications through user presentations
4. Opportunity for fun and networking with like-minded people

Tentative Agenda

- Welcome Address
- SIMULIA on the Cloud
    - A new way of using your favorite simulation tools
    - Live demonstration of best-in-class multiphysics tools, available on the Cloud
- Open House with Dassault Systèmes Spain experts
- Closing

Meet the Speakers

Pablo Gonzalez, Project Engineer, PRINCIPIA
Pablo González has a first degree in Industrial Engineering (Universidad Carlos III, 2015) and a PhD in Mechanical Engineering and Industrial Organization (Universidad Carlos III, 2020). His doctoral thesis dealt with

"Analysis and modelling of the behavior of carbon/epoxy laminates during impact".
Prior to joining Principia, Dr. González gathered industrial, research and teaching experience in the area of computational mechanics. In particular, he gained considerable experience in solving dynamic problems for the aerospace industry.
He joined Principia in 2019. While in Principia, it is worth highlighting his contribution to the study of impact problems, as well as to the dynamic analysis of structures.

Margarita Riera
R&D Applications Manager Specialist, XFlow R&D Support, SIMULIA EuroWest
Margarita has an MSc Degree in Naval Architecture and Marine Engineering by Universidad Politécnica de Madrid in Spain. She has developed her entire career in Research and Development for different industries like marine and offshore, solar energy and bioenergy power plants as a CFD engineer and consultant in important Spanish corporates such as Iberdrola and Abengoa Research.

She also has a brief experience as a Lab Assistant University Professor at Universidad Loyola Andalucía in 2016. She joined Dassault Systèmes in 2017 as an Application Engineer in the XFlow CFD R&D team, where she develop tasks such as training for customers and partners, customer support for many different industries and contribution to the CFD software improvement through validations and benchmarking

Francisco Riera
Director of Projects, PRINCIPIA
Francisco is a Mechanical Engineer (Escuela Superior Politécnica del Litoral, Ecuador, 1998) and has a PhD in Mining Engineering (Universidad Politécnica de Madrid, 2004). He is currently Project Director in Principia. Since joining Principia in 1999, he has participated in a large variety of projects, mainly related with the dynamic analysis of structures: impact, metal forming, collapse, etc. He was particularly active in the aerospace sector and accumulated considerable experience analyzing composite parts under static and dynamic loads, with emphasis on bird impacts and other fast transients.

In fluid mechanics, Dr Riera has carried out many projects on the dispersion of effluents in water bodies, and participated in other projects, like the simulations of the extraction of fuel from the Prestige tanker.

Eloy Rama
Sales Representative, SIMULIA Spain and Portugal
Eloy has a degree in Mechanical Engineering from University of Vigo. He joined Dassault Systèmes SIMULIA in 2012. His previous roles include technical consulting and training for customers of several industries in Central Europe, based in Vienna, Austria, and specializing in structural analysis and process automation & design exploration. Since 2019, he is in charge of the

Register

SIMULIA business in Spain and Portugal, based in Madrid. Eloy is also lecturer at the University of Applied Sciences Technikum Wien (Austria), where he teaches courses on finite element analysis and strength of materials.

SIMULIA France Regional User Meeting 2020

November 17, 2020

9am-10am CEST

SIMULIA France is delighted to announce its Regional User Meeting within the Global 3DEXPERIENCE Modeling & Simulation Virtual Conference. This interactive session will focus on Dassault Systèmes' new cloud technologies for physical simulation. The session will be led by the SIMULIA EuroWest team and held in French.

Meeting Highlights

- Introduction into SIMULIA's recently launched new grid computing offer on the Cloud
- Deep dive into how this new technology allows the running of any sized model, from any physics, with the best possible performance, whatever the creation environment, and using our "legacy" tools or the 3DEXPERIENCE platform
- RENAULT will illustrate these features on an industrial example, showing how they complement our authoring applications on 3DEXPERIENCE Cloud and completely overcome the constraints of installing and configuring hardware

Tentative Agenda

- Welcome Address
- New Approach for execution on 3DEXPERIENCE Cloud
- Demonstration on Renault case
- Open House Q&A with EuroWest SIMULIA experts
- Closing

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Meet the Speakers

Pierre Eliot
Technical Sales Director, SIMULIA EuroWest

Pierre is an experienced professional with 20 years of experience on FEA software from various providers and areas of industry. He started his career in the R&D department at a French Tier1 Automotive supplier. He has been with Dassault Systèmes since 2001 and has had a variety of roles, including Technical Support Engineer, Training Manager, Service Manager and Technical Sales Manager supporting SIMULIA Software sales. He is now in charge of the SIMULIA Technical Team in the EuroWest region.

Vincent Scordia
Technical Sales Senior Consultant, SIMULIA EuroWest

Vincent started his career in 1999 within an automotive supplier as a service provider, focusing on FEA calculations of all types and correlation with tests. 3 years later, he joined a first-rate builder on similar activities. He has been with Dassault Systèmes since 2005. Support, training and service activities marked his first years before he joined a team specializing in pre-sales. Vincent now leads the pre-sales team for the automotive industry.

Wilfrid Reuter
Sales Expert, SIMULIA EuroWest

For more than 10 years, Wilfrid has supported manufacturers in the automotive and aeronautics sectors in their digital transformation and in the adoption of simulation, always early in the design cycles. He is a graduate engineer from UTC.

Emmanuel Vanoli
Technical Sales Senior Specialist, SIMULIA EuroWest

Emmanuel has a Master degree in aerospace engineering from ISAE Supaero and joined EXA Corporation as an Application Engineer specializing in fluid dynamics. At EXA, Emmanuel had the opportunity to work on various projects including aerodynamics, aeroacoustics and thermal simulations for several industries such rail, industrial equipment and aerospace. He also led the technical deployment of PowerFLOW at SAFRAN Aircraft Engines, before managing all technical activities for CFD simulations with SAFRAN. Since the beginning of the pandemic, he has worked to help our hospitals by adapting his expertise in CFD simulations for particle propagation issues and is currently actively working with different hospitals in France on virus propagation and air quality simulations.

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SIMULIA EuroMed Regional User Meeting 2020

November 17, 2020

9am-10am CEST

SIMULIA EUROMED is delighted to announce its Regional User Meeting within the **3D**EXPERIENCE Modeling & Simulation Virtual Conference.

We know that a virtual global event can't replace our face-to-face local user meetings. Therefore, as we try to adapt to the new normal, we are bringing your local SIMULIA team and your local simulation friends and peers closer to you. Please join us for this 1-hour LIVE session to focus on the local topics and trends that matter most to you. Ask questions to the SIMULIA team, chat amongst yourselves about the topics raised, and engage. Be part of your simulation community – we'll all still be here!

This session provides an invaluable platform for industry and academia to learn how the latest simulation technology and methods can accelerate and improve product development. Meet and hear from the SIMULIA team and watch presentations about the use of simulation in your region.

Meeting Highlights

1. Live demonstration of the best SIMULIA solution
2. Voice your opinion to SIMULIA senior management attending the session
3. Listen to some of the best-in class SIMULIA applications through user presentations
4. Opportunity for fun and networking with like-minded people

Final Agenda

- Welcome Address – *Guido Porro, Emmanuel Leroux*.
- **3D**EXPERIENCE CATIA and SIMULIA for Lightweight Engineering: our experience on Additive Manufacturing problems – *Elena Dordoni, Marco Tagliabue*.
- How using the 3DEXPERIENCE® platform speeds up the ElectroMagnetic Validation of your UAV through a bi-directional connection of CST STUDIO® with CAD and PLM – *Emmanuel Leroux*.
- Closing – *Emmanuel Leroux*.

Meet Our Speakers

DR. GUIDO PORRO, EUROMED MANAGING DIRECTOR

Guido Porro returns to Dassault Systèmes Italia as CEO after a two-years experience at the French headquarter in Paris, where he held the role of Vice President responsible for the Indirect Channel. As Managing Director for Mediterranean Europe and CEO in Italy, he immediately set himself the goal of increasing the strategic role of the company in the Italian and European ecosystem, through the sustainable development of

priority sectors of the industry, with particular focus on the training and enhancement of the 'Workforce of the future'. Prior to joining Dassault Systèmes, Guido have had increasing importance at 'Oracle', becoming Senior Director, in 'Boston Consulting Group' as Management Consultant and at 'Accenture', with specific expertise in Energy, Industrial Equipment and Retail sectors.
Born in Cantù in 1975, he graduated in 'Political Economy' from Bocconi University (Milan) and obtained a Master in Business Administration from INSEAD Business School. He is married and has three children.

DR. EMMANUEL LEROUX, EUROMED SIMULIA SALES LEADER

Emmanuel received his Ph.D (Summa Cum Laude) in Electronics in 1998 at University of Lille in France working together with Politecnico di Torino in Italy on the topic: "Implementation and validation of a method to predict the radiated emissions from Printed Circuit Boards (PCBs) and attached cables". In 1994 he started working for High Design Technology as PCB Signal Integrity Applications Engineer. In 2000 he joined Computer Simulation Technology (CST) in Darmstadt as Applications Engineer. In 2001 he opened the CST Sales and Support activities in Italy, working as Technical Sales Manager and then from 2005 became for CST Country Manager for Italy, Israel,Turkey. After acquisition of CST from Dassault Systemes he was asked in 2017 to manage the SIMULIA Center Of Excellence (CoE) team in the southern East Mediterranean cluster (EUROMED). Since 2018 he was been working as EUROMED SIMULIA Sales LEADER. His missions are to drive the high Contribution of the SIMULIA Brand as a Key and Major Contributor of the EUROMED Achievement both for Direct and Indirect Sales channels and build a realistic and documented plan for EUROMED that can deliver double digit Growth Year on Year.

DR. ELENA DORDONI, EUROMED INDUSTRY PROCESS CONSULTANT SPECIALIST

Elena holds a Master's Degree in Biomedical Engineering and a PhD in Bioengineering from Politecnico di Milano; she joined Dassault Systémes in 2017 as SIMULIA Technical Pre-Sales, focusing her activities in bringing simulation values in business transformation processes of large companies, mainly in automotive sector. Before joining Dassault Systémes she worked as an Application Engineer for a PTC reseller, developing knowledge in CAD and PLM systems.

DR. MARCO TAGLIABUE, EUROMED CUSTOMER SOLUTION CATIA SALES EXPERT SPECIALIST

Marco holds a Master's Degree in Aeronautical Engineering from Politecnico di Milano; he joined Dassault Systémes in 2016 and has been taking care of the CATIA Sales in EUROMED ever since. Before joining Dassault Systémes he worked as a FE Simulation tech sales in Siemens Industry Software and as an application engineer for LMS and Samtech before their acquisition by Siemens.

SIMULIA North America Regional User Meeting 2020

November 17, 2020

12pm-1pm EST, 11am-12pm CST, 9am-10am PST

SIMULIA North America is delighted to announce its Regional User Meeting within the Global 3DEXPERIENCE Modeling & Simulation Virtual Conference. This session provides an invaluable platform for industry and academia to learn how the latest simulation technology and methods can accelerate and improve product development. Meet and hear your local SIMULIA team and watch presentations about the use of simulation in your region.

Meeting Highlights

- Live Keynote from Parker Hannifin: Fluidic Generative Design for Additive Manufacturing
    - With the newest trend for optimization technology being flow optimization, there are a new set of challenges to understand and address, such as finding feasible flow paths that form complex networks throughout a product, while ensuring consistent flow efficiency. Additionally, simulation plays a critical role in understanding and assessing the manufacturability of these parts.
- Live Panel Discussion on Simulation Trends with SIMULIA Customers and SIMULIA Technology Leaders
- Opportunity to interact and chat with fellow users, SIMULIA Leadership and SIMULIA Experts
- Live QA and Polling

Tentative Agenda

- Welcome Address
- Parker Hannifin: Fluidic Generative Design for Additive Manufacturing
    - Potential use cases and industries who can benefit from flow optimization
    - The challenges and benefits of flow design and optimization
    - Deep dive into an end to end flow optimization case study, including an assessment of the methods available to simulate the additive manufacturing process
- QA & Polling
- Panel Discussion on Simulation Trends
- Closing

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Meet the Speakers

Shashank Aggarwal
Director, SIMULIA Sales, North America

Shashank Aggarwal is an accomplished sales and technology leader with a passion for simulation. He started his career at Dassault Systèmes as an application engineer for the SIMULIA brand after completing a master's degree in Mechanical engineering from The Ohio State University. During the last 15 years with Dassault, Shashank has successfully transitioned from applications engineering to sales and then to sales leadership roles helping transform the organization and significantly grow the SIMULIA value delivery in critical industry segments and through direct and indirect channels. Shashank currently leads the SIMULIA sales organization for North America helping deliver simulation value to help Dassault Systèmes customers with sustainable innovation in their product development process. Shashank lives in San Francisco with his wife and two kids and loves spending time outdoors.

Suchi Rajendran, Parker Hannifin, Modeling & Simulation Engineer

An experienced advanced system design and modeling engineer, Suchi has worked on multiple engineering problems in both the academic and industrial worlds. Her current focus is to advance filtration systems within Parker Hannifin by developing tools to gain insights into the physical processes involved in fluid and particle separation systems. She is an active proponent of physics-based modeling and simulations to advance research and product development. This outlook makes her fascinated by cutting-edge advancements in computational technology and she always looks forward to experimenting and testing any such new evolutions in that realm.

Saurabh Bahuguna
SIMULIA Director, Technical Sales

Saurabh Bahuguna leads the Dassault Systèmes SIMULIA Brand Technical team for AMERICAS, helping deploy technology leading simulation solutions to improve our customer's product development process. Saurabh has been with Dassault Systèmes for 20 years in several roles, providing technical leadership via close collaboration with customers. He has a PhD in Engineering Mechanics from Case Western Reserve University. Saurabh is passionate about technology and mentoring and enjoys coaching the local robotics teams, introducing students to use of simulation in robot design.

Dr. Edward Tate

Industry Process Expert SIMULIA Senior Director, Dassault Systèmes

Ed's role is to refine and deploy SIMULIA's solutions so customers can design better vehicles faster with less expense and risk. He graduated from Stanford University and the University of Michigan and has more than 25 years of experience in the automotive industry. Among the programs he worked on were the General Motors EV1 and the Chevrolet Volt. His focus is on improving vehicle efficiency, performance, durability, and comfort. This focus resulted in 40 patents covering vehicle electrification, batteries, thermal management, and controls. His work is used in production vehicles today and also used to develop the next generation of vehicles.

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SIMULIA Brazil Regional User Meeting 2020

November 17, 2020

2pm-3pm BRT

SIMULIA Brazil is delighted to announce its Regional User Meeting within the Global 3DEXPERIENCE Modeling & Simulation Virtual Conference.

This session provides an invaluable platform for industry and academia to learn how the latest simulation technology and methods can accelerate and improve product development. Meet and hear from the SIMULIA team and watch presentations about the use of simulation in your region.

Meeting Highlights

1. Live chat with the SIMULIA experts in structures, durability and CFD
2. Listen to some of the best-in class SIMULIA applications through user presentations
3. Opportunity for fun and networking with like-minded people

Tentative Agenda

- Welcome Address
- User Presentation
- Talk to the SIMULIA experts
- Open House
- Closing

Meet the Speakers

Rafael Ihi
SIMULIA Design & Simulation Industry Process Consultant
Formado em engenharia aeroespacial, Rafael Ihi iniciou sua carreira na Dassault Systèmes SIMULIA em 2019, tendo trabalhado anteriormente como consultor para a Exa Corporation. Possui mais de 5 anos de experiência profissional em simulação computacional de dinâmica dos fluidos.

Eduardo Araújo
SIMULIA Industry Process Consultant
Eduardo has a MsC degree in engineering and 30+ years of experience in simulation, with emphasis in FEA. Prior to working at Dassault Systèmes, he worked at ESSS and MSC Software as application Engineer and at Embraer (composite materials) and INPE (satellite structures team).

Register

CATIA Live Talks – November 17

Requirements Engineering in Context of Model Based Systems Engineering

Multiple studies have shown that more than half of all the errors in systems development originate from missing, ambiguous or incorrect requirements. The cost of fixing these errors increases exponentially after the system is in development or implementation, therefore it is important to try to catch these errors during the Requirements Development phase.

This session will present how the 3DEXPERIENCE platform enables Requirements Engineering by bringing together the iterative & interleaving activities of Requirements Development and Requirements Management facilitated by integrated Requirements Planning and Requirements Traceability. Furthermore, the session will illustrate the rigor that can be built in the Requirements Development process leveraging the integrated model based capabilities from No Magic and Requirements in Loop simulation from Argosim to combat the problem of Requirements errors.

Sanjay Khurana, CATIA NAM Industry Process Consult - Mgt Director, MBSE & Electrical, NAM CATIA Technical Sales

Sanjay Khurana is an expert in Requirements Engineering & Model Based Systems Engineering. Sanjay has been working with multiple industries conducting in-depth research into customer business processes, supporting critical Engineering / Business Transformation strategies using Systems Engineering fundamentals. He's simultaneously working with Industry & Academia to advance the state of the art by bringing new Modeling & Simulation technologies together.

Sanjay is currently the Director of Technical Sales for Cyber / Electrical / Fluidic Systems at Dassault Systemes. He has a Bachelors in Industrial Engineering and Masters in Software Engineering. Sanjay is also a Certified Systems Engineering Professional (CSEP) from INCOSE.

Simulation for Designers

As we work closely with our customers to support the development of their innovative products, we also understand their challenges. In this Age of Innovation, the time to bring any concept or product to the market has drastically reduced. This has significantly increased the responsibility of design teams and designers in particular, to deliver innovative but robust design in very short time. Due to this, each and every design needs to evaluated right

at its inception on part and assembly level, which has resulted in simulation playing key role in the early phases of design.

Simulation for Designers provides connected, powerful and collaborative simulation solutions on the 3DEXPERIENCE platform. Performing simulation during the design phase empowers you to accelerate innovation by solving engineering challenges for your CATIA designs with full data associativity. Because both SIMULIA and CATIA operate on the 3DEXPERIENCE platform, they share a common user interface, which makes it easy for CATIA users to setup and run simulations, and share results with team members, from anywhere and at any time. The 3DEXPERIENCE platform enables your teams to assign tasks and use a single-source of data to ensure all team members are leveraging the current design to evaluate and improve product performance and speed up project delivery.

Nicolas Faure, CATIA Technical Director for North America, Dassault Systèmes

Nicolas Faure is a CATIA lover. He joined Dassault Systèmes in 2001 as an application engineer focusing on simulation for the aerospace industry. After several years, Nicolas took the leadership of the CATIA NAM Technical Sales team driving innovative projects with CATIA V5, CATIA V6 and now CATIA 3DEXPERIENCE. He holds a Master of Mechanical Engineering from a French Engineering school.

Anup Iti, CATIA NAM Industry Process Consult - Mgt Senior Manager, SFE CoE, CATIA Services

Anup is an experienced engineer working closely customers across various industries to support and improve their conceptual design processes. Having completed Master of Science in Mechanical Engineering from Wayne State University, Anup has been working in the field of conceptual structural engineering for 10 years. In his current role at DASSAULT SYSTEMES, within CATIA, he manages team of conceptual design domain experts and supports Technical Sales for CATIA SFE portfolio.

Register

Live Talks – November 18

SIMULIA Technology Updates and Live Q&A with R&D

Learn about key changes to our software on the following topics:

Simulation Update: Structures Part 1 & 2

This presentation will offer an overview of recent and upcoming highlights in the SIMULIA Structures simulation portfolio. In particular, new capabilities and key benefits of modeling and simulation in the 3DEXPERIENCE platform, enhancements to physics solvers, and enhanced structures workflows with SOLIDWORKS.

Keywords: Abaqus, fe-safe, Isight, Tosca

Presenters:

Jean Daniel Lecuyer, SIMULIA Portfolio Expert, Structures

Jean-Daniel Lecuyer is responsible for defining structural simulation solutions available on Dassault Systèmes' 3DEXPERIENCE platform. He has nearly 20 years' experience in physics-based simulation—first with an aerospace company, then Abaqus (acquired by Dassault Systèmes in 2005). His previous role as Demo Leader for the energy industry has brought him a large understanding of the various brand applications on the platform.

Delphine Genouvrier, SIMULIA Portfolio Expert, Structures

Delphine Genouvrier is a Product Director at SIMULIA R&D. A strong believer of the values of design simulation for all product designers, her objective is to contribute to simulation democratization for all company sizes, industries and products. Through experience in technical sales, business management and product management, Delphine has gained strong user feedback and shared her passion for simulation driven design with the designer community.

Asif Khan, SIMULIA Portfolio Expert, Structures

Asif joined the company in 1998 after graduating from Purdue University with a M.S. degree in Structural Engineering. He currently works as a Senior Applications Manager for the 3DEXPERIENCE Structural Simulation apps within SIMULIA R&D.

Eric Weybrant, SIMULIA Portfolio Expert, Structures

Eric joined Dassault Systèmes in 1999 and has held various positions with increasing responsibility including Customer Services Engineer, Development Engineer, and Product Manager. In his current role as Product Manager focused on Abaqus, Eric is responsible for release planning, gap analysis, and creating go-to-market content. Eric has a MS degree in Mechanical Engineering from the University of Maine.

Ryan Paige SIMULIA Portfolio Expert, Structures
Ryan Paige has more than 25 years engineering experience in the field of FEA simulation. This includes substantial practical application of FEA for product development, test correlation and structural analysis for engineers and designers in the aerospace, automotive and rubber industries.

Simulation Update: Fluids Portfolio

This presentation will offer an overview of recent and upcoming highlights in the SIMULIA fluids simulation portfolio. It will focus on new capabilities and key benefits of modeling and simulation connected to the **3D**EXPERIENCE platform, as well as enhancements to SIMULIA's Lattice Boltzmann solutions (PowerFLOW and XFlow), Navier Stokes solution (FMK), and potentially specialized application-focused solutions.

Keywords: PowerFLOW, XFlow, CFD

Presenters:

Jorge Ginés, SIMULIA Portfolio Expert, Fluids
Jorge Ginés has over 15 years of experience as a CFD user, applying different codes to solve design-engineering problems in Vehicle Aerodynamics, Motorsport, Thermal Management and Cabin Comfort for companies including SEAT, VW, AUDI, Ford and Airbus. He later transitioned to the software industry working in different projects on the business development side. Jorge joined Dassault Systèmes in 2016 as part of the Next Limit Dynamics acquisition.

Francisco Martínez, SIMULIA Portfolio Expert, Fluids
Francisco is the lead developer of XFlow and also manages the development of SIMULIA's Navier-Stokes solution available on the **3D**EXPERIENCE platform. He joined Dassault Systèmes in 2016 through the acquisition of Next Limit Dynamics.

James Hoch SIMULIA Portfolio Expert, Fluids
James Hoch is a Senior Director of R&D at Dassault Systèmes where he leads the development of CFD software, including the PowerFLOW suite. He previously worked many years for Exa Corporation, the original creators of PowerFLOW, as Senior Vice President of Software Development. Prior to joining Exa, James was the lead architect on several research parallel computer systems and related compiler projects at Sandia National Laboratories.

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Simulation Update: Electromagnetics

SIMULIA CST Studio Suite 2021 enhances versatility and performance for modelling, meshing and solver technologies as well as for leveraging electromagnetic simulation on the 3DEXPERIENCE platform.

Keywords: CST Studio Suite, 5G Network, Antenna and Microwave Component Design

Presenter:

Leonardo Sassi, Ph.D, SIMULIA Portfolio Expert, Electromagnetics

Leonardo is Portfolio Management Director of the Electromagnetics domain in the SIMULIA brand. He has more than 20 years' experience in Electromagnetic and Electronic Simulations working in the high tech, automotive and aerospace & defense industries. Leonardo received the Electronic Engineer Laurea and PhD at Politecnico di Bari, Italy. He joined CST in 2001 and later the SIMULIA brand in 2018 after Dassault Systèmes' acquisition.

Simulation Update: Multibody Dynamics

This presentation will offer an overview of recent and upcoming highlights in the SIMULIA Multibody Dynamics portfolio, including major functional enhancements within the high-end MBS software Simpack. In addition, enhanced possibilities to couple Simpack with the 3DEXPERIENCE platform will also be discussed.

Products discussed include: Simpack

Presenter:

Axel Dewes, SIMULIA Portfolio Expert, Multibody Dynamics

Axel holds a Diploma in Applied Mathematics and joined Simpack in 2005 as a Project Engineer. The company was later acquired by Dassault Systèmes in 2016. Today, he is responsible for Simpack product management and integration with the 3DEXPERIENCE platform.

Simulation Update: Vibro-Acoustics

This presentation will provide an overview of SIMULIA vibro-acoustic modeling and simulation methods. New methods and applications will be discussed along with benefits.

Keywords: Wave 6, PowerFLOW, Abaqus, Simpack

Presenters:

Arnaud Charpentier, SIMULIA Portfolio Expert, Vibro-Acoustics

Arnaud Charpentier is a Solution Consultant for wave6 based in Tokyo. He holds a B.S. in Mechanical Engineering from the University of Technology Compiègne and a M.S. in Mechanical Engineering from Virginia Tech. His responsibilities include the promotion, deployment and support of wave6 and development of innovative solutions for solving challenging vibro-acoustic problems in the full frequency range. With 20+ years' experience, Arnaud has been responsible for applying vibro-acoustic technology to products in multiple industries.

Phil Shorter, SIMULIA Portfolio Expert, Vibro-Acoustics

Phil Shorter has over 20 years of experience in the development of commercial vibro-acoustic simulation software. He was one of the co-founders of wave six LLC and led the teams responsible for the research, development, promotion and support of the Wave6 software. After the acquisition of wave six LLC by Dassault Systèmes, he has continued to lead the vibro-acoustics team as part of his role as a Senior R&D Director within SIMULIA. Phil holds a PhD in vibro-acoustics from the University of Auckland, New Zealand.

Simulation Update: Multiphysics / Electrification / Battery

Rechargeable battery cells are at the core of electrified systems whether that system is an electric vehicle or a phone. This presentation will offer an overview of recent developments and validated capabilities in SIMULIA for 3D battery cell/module/pack engineering. This includes multiphysics/multiscale modeling methods for thermo-electrochemistry, durability, safety and others to help you mitigate and improve key performance indicators such as capacity/performance, weight, risk of thermal runaway/short circuit, and battery life.

Presenters:

Victor Oancea, SIMULIA Portfolio Expert

Victor earned his PhD from Duke University in 1996 in the area of computational mechanics. He then joined Abaqus R&D development—now Dassault Systèmes Simulia Corp. Today Victor is Sr. Technology Director and Chief Scientific Officer for structural applications and leads the following initiatives: battery cell engineering, additive manufacturing simulation, micro-mechanics based multiscale materials, particle methods for extreme deformation, oil & gas multiphysics formulations, realistic human simulation capabilities and co-simulation-based multiphysics modeling.

Youngwon Hahn, SIMULIA Portfolio Expert

Youngwon Hahn received his PhD in Mechanical Engineering and Scientific Computing from the University of Michigan at Ann Arbor. After completing a post-doctoral research fellowship at U-M, he worked at Modine Manufacturing Company as a Senior Finite Element Engineer, and joined Dassault Systèmes in 2008. He is working as Sr. Portfolio Technical Specialist for SIMULIA in the fields of Durability, MBD, NVH, Turbomachinery and Battery.

Simulation Update: Simulation Process Automation & Design Exploration

In this session we will present updates from our Simulation Automation & Design Exploration portfolio. We will describe the new capabilities and key benefits in both parametric & non-parametric technology and application areas.

Keywords: Isight, Tosca Structure

Presenters:

Peter Bill, SIMULIA Portfolio Expert, Simulation Automation

Peter Bill gained experience of FE stress & vibration analysis at British Aerospace & Rolls-Royce and moved into the software industry with technical roles at PDA Engineering & later MSC Software. Peter's focus on Simulation Automation & Design Exploration began in 2001 at Engineous Software and later Dassault Systèmes. He recently joined the SIMULIA R&D organization with responsibility for the simulation automation portfolio.

Peter Allinger, SIMULIA Portfolio Expert, Structural Optimization

Peter Allinger has been working in the area of structural optimization for more than 20 years. In 1998 he co-founded FE-Design GmbH and led the software development department of the company. After the acquisition by Dassault Systèmes he has continued to lead the software development team for structural optimization

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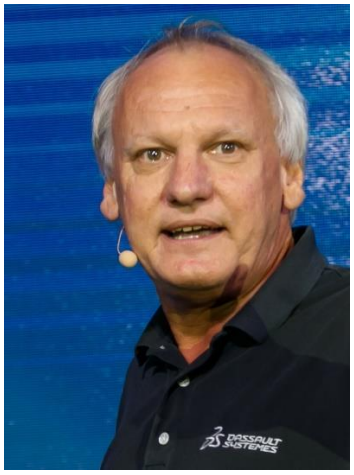
CATIA Live Talk – November 18

CATIA 21x

Lightweight Engineering is just a must today: one wants to reduce the weight of non-critical components to provide the best experience to the customers by adding new services. In parallel, one can see the emergence of new manufacturing technology such as Additive Manufacturing: one can now manufacture parts, lighter, as they just use micro-structures (so-called lattices) in place of plain material (heavier by nature). **3D**EXPERIENCE 2021X (due for November 2020) will allow the user to design these lattices but also validate the latticed product by FEA and of course, 3D print them. This is what will be shown live and discussed in the session. The second part of the live talk will be around 3D Master: most of the delivered drawings and their 3D models parents are inconsistent and the consequence is a lot of errors occurring at the manufacturing stage. So the idea of dimensioning and tolerancing directly on the 3D model has been adopted for many years by the Aerospace industry and in the last 5 years by more and more other industries. But it's not that easy to dimension and create tolerances in 3D as the big constraint is to stick to strict standards: only this compliancy with standards avoids misinterpretations leading to the same inconstancy when 2D drawings were the master. Good news, since this summer, CATIA now delivers a paradigm shift capability to automatically generate this fully standards compliant, dimensioning and tolerancing schema from the description of the various mechanical interfaces between the parts of a given assembly. Interested? Curious? Attend this session to discover what is now possible in **3D**EXPERIENCE CATIA.



Daniel PYZAK Mechanical Industry Process Consult - Mgt Senior Director, CATIA Mechanical

Daniel graduated in Mechanical Engineering. He has over 37 years of experience in CAD/CAM/CAE/PLM. After positions held in technical support and product management in various CAD/CAM companies (Cisi, Cisigraph, Matra Datavision), he joined Dassault Systèmes Provence in 1999 to manage the Competency Center. The main activities of DSP Competency Center are around tooling, machining, reverse engineering, rapid prototyping/additive manufacturing and data exchanges. Ten years later, he became responsible of different CATIA technical teams for the Europe-Middle-East-Africa-Russia geography around Design and Engineering. In January 2019, he got the responsibility of the worldwide CATIA Mechanical Systems Modeling and Simulate Centre of Excellence, with a strong focus on Lightweight Engineering: Generative Design, Composites, Mold & Die, Additive Manufacturing. And since beginning of 2020, he is managing the worldwide CATIA Mechanical Industry Process Success Organization: to make a long story short, just taking care of all the CATIA Mechanical customers and ensure they are taking the most benefits of their use of CATIA (and have a lot of fun!).

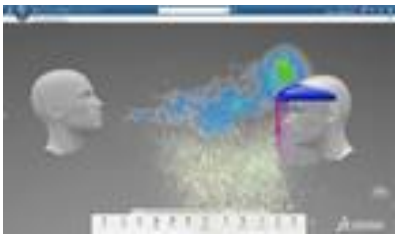
Register

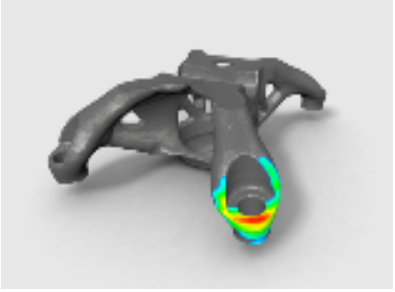
3DEXPERIENCE Playground

Learn more about our technology and hot topics in key industries. Take a virtual walk through the 3DEXPERIENCE Playground, visit our virtual booths equipped with demonstrations, literature and fun for attendees to enjoy! Our booths will feature:

- Noise & Vibration for Ride Comfort
- 5G for the Next Industrial Revolution
- Securing the New Normal - Creating A Safe Life Environment During the Covid-19 Pandemic Through Simulation
- Leverage Simulation to Meet Emission Regulations in the Age of WLTP
- The Future of Mobility with Electric Vehicle Simulation
- Bringing Simulation to Life with Advanced Visualization
- Digital Thread for Additive Manufacturing
- Cyber Physical Systems
- Light Weight Engineering
- Concept Structure Engineering
- Design & Engineering





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Caelynx

Caelynx is a Detroit-based team of highly skilled engineers providing CAE services and software to companies across the United States. We help companies bring higher-quality products to market faster by providing accurate and trustworthy simulation as both a services consultant and software provider. Caelynx is your top-tier Dassault Systèmes software reseller and support/training center!

CAE SoftSys

CAE SoftSys is a global provider of resources, processes & technologies, delivering strategic client partnerships to force multiply & accelerate key business initiatives, through our complete product development, simulation & I.T. services offerings. As a Dassault Systèmes' Partner, across CATIA, SIMULIA & 3DEXPERIENCE, our team helps evaluate, validate, acquire, deploy & administer these transformational technologies.

DatapointLabs

DatapointLabs, founded 1995, had a mission to provide scientifically accurate material data for use in engineering design & simulation. To date, more than 30,000 materials have flowed through the laboratory, providing data for over 1,200 companies globally. In 2018, DatapointLabs joined the Applus+ Group, a worldwide leader the testing, inspection &

certification sector. In 2020, they celebrate 25 years of putting materials into product design.

Endurica

The Endurica Solution is for leaders who want to Get Durability Right. Our tools include Rubber Fatigue Analysis Software, Testing Instruments, Material Characterization, Consulting Services and Training. We continue to invest strongly in the Endurica tools. Our 2020 release is our most polished and capable yet, and it will delight the users with full road loads, faster run-times, file encryption and more. Endurica is Winning on Durability.

Hawk Ridge Systems

Hawk Ridge Systems helps product development teams, engineers & manufacturing executives make decisions that will drive your business goals forward. Our experienced team of 3D design & manufacturing experts will work with you to understand your business challenges & help craft solutions that will exceed your expectations. With a team serving over 23,500 customers, Hawk Ridge Systems is ready to help you make the right choices for your business.

Inceptra

Inceptra is a leading provider of PLM technology and services to engineering and manufacturing companies across a variety of industries with over 30 years of results-focused experience providing extensive solution and process expertise. We are a Dassault Systèmes Platinum Partner dedicated to the 3DEXPERIENCE portfolio, complimentary software, internally developed PLM acceleration solutions, and comprehensive services to maximize their value.

Intel

Intel Corporation offers compelling HPC resources to advance discovery and speed innovation. The 2nd Generation Intel® Xeon® Scalable processor family is the only AI-ready CPU with Intel® Deep Learning

Boost. It also offers outstanding performance with a unique combination of compute, compute density, memory bandwidth, balanced I/O, platform technologies, and real-world performance powering the most compelling platforms available for HPC today.

Synopsys

The Simpleware Product Group at Synopsys develops software for the conversion of 3D scan data (MRI, CT) into high quality design, simulation and 3D printing models. Simpleware software is used in fields such as the Life Sciences, Materials Science, and Industrial NDE. Easy-to-learn and use, the software links imaging, design, and simulation.

S VERTICAL

S VERTICAL is a services and solutions provider company specialized on high quality mechanical engineering. Leveraging industry proven methods and experienced team members, S VERTICAL puts together clear and concise custom simulation tools focused on enhancing customer's productivity. Today, S VERTICAL is focused on the development of WoundSim software, a new generation tool to design and simulate composite overwrapped pressure vessels (COPVs).

TotalCAE

TotalCAE enables clients to reduce simulation time with HPC cluster appliances and public cloud for engineers, all managed by TotalCAE. The TotalCAE Platform makes HPC and Cloud easy to use for hundreds of engineering applications, with just three clicks to solve. TotalCAE supports a single interface across all major hardware and public cloud providers, enabling our clients to run HPC anywhere for maximum flexibility, all managed by TotalCAE

Wolf Star Technologies

Wolf Star Technologies commits to helping clients realize their product development goals by leveraging the strengths of FEA analysis. We offer consulting services to assist with delivering decision ready solutions for our clients' projects and truly unique software solutions (True-QSE™, True-Load™ and True-LDE™) available nowhere in the FEA industry. These solutions work with any FEA platform to better leverage customers' investments in FEA.

VIAS

VIAS is a Dassault Systèmes Platinum Partner providing engineering analysis & design solutions using virtual experience & data analytics in a variety of industries including Aerospace & Defense, Marine &Offshore, Transportation & Mobility, High Tech, Consumer Packaged Goods, Energy & Life Sciences. Our objective is to prevent repetitive design-related business interruptions and to provide cost-effective, quick & safer designs.

Exhibitors

Advisian

Advisian, a dedicated partner for Dassault Systèmes' SIMULIA Abaqus & packaged software products since 2000, currently operates in Singapore, Malaysia, & Indonesia. Our deep consulting heritage builds on vast experience of our technical experts to offer the most practical & cost-effective solutions & in-house CAE capability.

Nor-Tech

Nor-Tech is a system integrator specializing in HPC hardware and software integration and deployment. As an elite Abaqus integrator, Nor-Tech's custom technology also includes workstations. With over 16 years in the HPC industry, our experience includes

solutions based on both Windows and Linux platforms.

TATA TECHNOLOGIES

Our vision is to engineer a better world by helping clients realize better products & improve quality of life. We achieve this through product engineering expertise focused on manufacturing technologies, electrical vehicle programs & IT & PLM solutions to help design products that are safer & have a lower carbon footprint.

Register

Breakouts Abstracts

Please note: abstracts can be subject to change.

Concept Structure Engineering

Mazda Motor Corporation

MAZDA Development Process Innovation Utilizing SFE Concept

Tomoe Matsuoka

Since 2011, MAZDA has introduced its vehicles to all the owners to deliver "FUN TO DRIVE", "SUSTAINABLITY and SAFETY" through the Skyactiv Technology. MAZDA's mission for this market delivery on time requires further development process innovation, and in the advanced development phase, where 3D CAD model is usually not available, MAZDA needs to create a concept model that helps to distribute the target vehicle performance into functions. MAZDA utilizes SFE Concept to build the concept vehicle model and efficiently identify the design parameters that meet those functions. In this presentation, we present the past use-cases and the plan of SFE Concept projects in MAZDA.

Nikola Motors

Load Path Optimization for Vehicle Frames

Saeid Emami, Director of CAE

A vehicle development program comes along with many challenges, especially when there are no design predecessors, for instance due to vehicle electrification. At the same time, this is a rare opportunity to explore new design ideas with recently advanced analytical methods, as well as manufacturing processes, and materials. This presentation showcases an innovative workflow for developing a tubular vehicle frame with no legacy data. In this scheme, 1-dimensional beams are initially used to identify, validate and optimize load paths. Based on this, a 3D parametric simulation is automatically generated to further validate and confirm the design. The 1D model is built using SFE CONCEPT where the data points are automatically fed into. Simulations are done in ABAQUS and optimized throughout the process using Isight.

Pan Asia Technical Automotive Center Co., Ltd

Efficient and Collaborative Automation Integration Optimization Design

Guohong Shi, Technical Manager

Discover the application of the key technology of lightweight structure, fully parameterized model, automatic tool integration and rapid pre-processing and multi-disciplinary integrated optimization design in the vehicle development process

Brilliance-auto Engineering Research Institute

Lightweight Design of Power Battery Compartment Based on Implicit Full Parameterization Technology

Ying Liu, Technical Manager

In order to realize the lightweight design of a lithium-ion power battery compartment of an electric vehicle, an implicit parameterized model of the battery compartment was established by using SFE Concept, and the optimization process of the battery compartment was

established by combining Isight optimization platform, the assembly position of battery hoisting components and wall thickness of key components were taken as design variables, the overall quality of battery compartment was taken as the objective function of optimal design, and the structural stiffness, strength, fatigue endurance and NVH performance were taken as constraint conditions. The results showed that the weight of the battery was reduced by 2.6%. It can be seen that this method has important reference value for the forward design and development of battery compartment structure.

Dassault Systèmes
MODSIM Workflow for Roll-over Protection Structure Analysis
Ashish Aggarwal, CATIA Senior Industry Process Consultant
Heavy mobile equipment usually serves in very severe situations such as quarry, trench and so on. Rollover is the main cause of causalities in excavation industry. Due to which, strict regulations have been imposed to develop ROPS structures. Evaluating cabin safety performance, as per regulation, through testing is time-consuming and often leads to late issue discovery which is expensive to fix. Ability to have 3D geometry in early design which can be evaluated for stiffness and safety to find out possible design issues, will speed up the development process, allows to make data driven decisions and come up with safer, compact design which is cost effective.

Dassault Systèmes
Conceptual Design and Evaluation of Airframe Structure
Martin Dreau, CATIA WW Industry Process Expert Specialist
Being flexible and fast as well as adopting a MODSIM approach in the early phase of product development is becoming a must. This is all the more important in the competitive context of eVTOL and new trends Aero-mobility, where innovation is a differentiator. This presentation showcases the power of CATIA SFE to create parametric Concept models in a short time frame, before CAD design is kicked-off. These model are further leveraged to support, multi-disciplinary optimization which includes internal loads & crashworthiness scenarios.

Cyber Physical Systems

Dassault Systèmes
Multidisciplinary Systems Modeling and Analysis
Behnam Afsharpoya, CATIA NAM Senior Industry Process Consultant, MBSE & Electrical
Evaluation of multiple physical systems simultaneously through heterogeneous and descriptive architecture of a cyber system is a challenge for systems engineers. Mostly, physical systems defined and modeled by different disciplines are using different analysis and simulation tools leading to isolation of the generated data in separate silos. Model based system engineering provides a common platform for integration of multiple domains. However, for complex systems with multiple physical domains, it is necessary to integrate several simula-

tion models from different simulation and analysis tools. Co-simulation is one of the methods that allow individual simulation tools exchange system variables and parameters as well as synchronizing their simulation at each time step. Functional Mock-up interface (FMI) provides a common standard for integration and execution for the tools that are compliant with this standard. This standard allows multiple tools to access equations of the models without revealing their contents and risking intellectual properties (IPs). We propose a co-simulation methodology based on SysML models to integrate and execute multiple physical models. The co-simulation utilizes integration of Functional mock-up units (FMU) from several simulation tools and executes them through SysML based parametric and behavior diagrams. Results of such a modeling system can directly evaluate requirements or satisfy demands for preliminary evaluation of system specifications.

Dassault Systèmes

Model Based Systems Engineering for Battery Design

Behnam Afsharpoya, CATIA NAM Senior Industry Process Consultant, MBSE & Electrical

Several engineering disciplines collaborate to develop and manufacture new battery cells and packages. Complexity and cost of new battery development demand digital continuity and complete integration of engineering and data management tools. Model Based Systems Engineering (MBSE) approach provides a platform for integration of multiple simulation tools simultaneously and communication among engineering disciplines efficiently. Requirement engineering helps to elicit requirements from different stakeholders and MBSE approach manages evaluation of simulation models and test results against requirements. This presentation provides an overview of how MBSE approach can improve process of design and verification of new battery development in context of a larger system such as electrical vehicles.

Dassault Systèmes

Modeling and Simulation of Complex Systems for Virtual Commissioning of Manufacturing Processes

Behnam Afsharpoya, CATIA NAM Senior Industry Process Consultant, MBSE & Electrical

Virtual Commissioning is an economical method to validate and verify design of a manufacturing process before and during operation. 1D simulation tools predict behavior of a system under variant environmental and working conditions. Co-simulation of 1D and 3D models can provide an economical method to simulate very large systems in an efficient timeframe. This presentation describes a methodology that simulates very large mechatronics models in real-time with complex programmable logic controller (PLC) based control systems. The proposed method is based on the Modelica that simulates dynamic behavior of the system and implements it to the ControlBuild software that directly controls PLCs. This platform can provide digital continuity from CAD design, requirements, functional and logical models in systems architecture to the real PLC system that controls an industrial machine.

Dassault Systèmes

MBSE: The Future of Performance Design Using an MBSE Approach: Application to Electric Vehicles

Gauthier Fanmuy, Systems Engineer Portfolio Management Director, CATIA Systems Portfolio

For various reasons, most of today's automotive developments are struggling with discipline silos such as mechanical, electrical, electronics, software, etc. The lack of global behavior analysis across the components of the system and the inconsistencies of the interfaces lead to product quality issues, late rework and even worse - recalls. As vehicles are getting more and more complex with new technologies and features, and more and more connected, such traditional, mostly document-based engineering is not anymore fit to purpose. For an electric vehicle for example, having the right technology is important, but one of the difficulties is to develop a balanced product to fit several usages. Designing proper components and parts of the vehicle with the right behaviors and performance characteristics at the first shot, in shortened time frames is now an absolute necessity. This session explains the value of performance design in a Model Based Systems Engineering approach. This approach will be illustrated with an electric drive through a methodical walk through.

Dassault Systèmes

Requirements Simulation and Validation

Yves Genevaux, STIMULUS WW Center of Excellence Director

Requirements Engineering tools have only focused on Requirements Management and Traceability. There was no validation tool available for checking the requirements correctness. As a result, around 70% of the defects created during a project are actually located in the textual requirements. Dassault Systèmes' CATIA Stimulus provides a very innovative solution for the verification of functional requirements during the specification phase. STIMULUS' unique editing, debugging and simulation features enable the user to develop incrementally a specification based on textual requirements, state-machines and block diagram. Functional Safety Engineers can also verify if the specification meets the Safety Requirements. Later on, Test Engineers can automatically verify that the actual system meets its specification. The manual development of test cases is no longer needed. STIMULUS relies on a high-level textual language to express requirements and a simulation engine based on a constraint solver to generate and analyze execution traces of the specified system. We will present and demo STIMULUS and the results achieved in embedded systems development projects.

Dassault Systèmes

Systems Traceability in Heterogeneous Environments

Rosa Gragossian, CATIA NAM Senior Industry Process Consultant, MBSE & Electrical

Dassault Systems' 3DEXPERIENCE open platform provides innovative solutions for Systems Engineering processes, including advanced requirements/change/variant management, multi-discipline modeling, simulations, and global traceability. An innovative solution for Systems Engineering and V&V processes, offered by 3DExperience platform, allows for full traceability between heterogeneous product artefacts. Traceability from requirements to implemented models and objects to means and results of tests, simulations and compliance. Also providing flexible visualization of these artefacts, regardless of their sources. In this presentation, we will explain how the SE, V&V and certification processes are empowered by this solution.

Dassault Systèmes
Developing Cyber Physical Systems with SysML
Ron Kratzke, CATIA NO MAGIC - CYBER SYSTEMS Industry Business Senior Consultant
Effective system design when using the Systems Modeling Language (SysML) in a model based systems engineering (MBSE) toolset depends on application of a methodology to create the system model. Additionally, the acquisition project used to control and manage the design of a new system requires the team to provide progressively detailed reports on the system design model. "Developing Cyber Physical Systems Using SysML and the MagicGrid Framework" explores where the system modeling effort fits into the overall platform tool chain, why the use of SysML is a necessity when doing system design, how the MagicGrid® Framework is used to complete system, and an overview of how CATIA Magic and MagicGrid can be used to develop the system and support key acquisition milestone / decision meetings.

Design with Integrated Modeling and Simulation

MARIC
Application of CAD-CAE integration Technology in Ship Design
Sihao Xu, Digitalization Engineer
Review the framework of SFA module on 3DEXPERIENCE, based on which a technical solution will be discussed on its position in a design cycle, with real projects presented. Moreover, thoughts on future technology trends will be shared.

China National Erzhong Group
Simulation democratization application based on 3DEXPERIENCE platform
Yuyan Hong Senior Engineer
For a long time, the model of CAE simulation is not related to the CAD model. When Venus has multiple rounds of design-analysis iterations, repeated operations will be required, which greatly reduces the time rate of product development and extends the development cycle. At the same time, traditional CAE software has high door-to-door performance for users. How to achieve the relationship between the CAE model and the CAD model, the integration of design, design and analysis is very important, and the 3DEXPERIENCE platform

can achieve our expectations, and at the same time Realize the design of additive manufacturing in an integrated environment.

China Nuclear Power Engineering Co Ltd.

Co-design of Nuclear Power Main Equipment Based on 3DEXPERIENCE

Dong Zhao, Chief Engineer for Collaboration design project, Data integration domain

With the simulation process and data management for the equipment of the nuclear power station, a collaboration environment is built to make sure the whole design and simulation could be more standard , from the project management, simulation execute and the data extraction and application. With this collaboration platform, the design and simulation efficiency has been enhanced greatly.

VIAS

Demonstrating the Power of 3DEXPERIENCE Design and Simulation Roles for Integrity Management and Additive Manufacturing for Industrial Facilities

Glenn Larson, CATIA Senior Sales Engineer

This work describes the power of 3DEXPERIENCE design tool CATIA to generate 3D surfaces and solid models from laser scan data and drawings for the purposes of structural integrity assessment and onsite manufacturing of critical components using additive manufacturing. In industrial facilities, assessing the structural integrity of equipment with damages and flaws becomes important. Using the advancements in laser scan techniques, CATIA can be used to import point-cloud data in formats such as STL and generate realistic surface of the equipment such as drum, tank, and pressure vessel. These surfaces can then be imported in Abaqus/CAE to perform Level 3 Fitness-for-Service (FFS). Another important issue faced by facilities is that many times equipment may fail where the production of the failed part has become obsolete. With the advent of additive manufacturing, parts can be made onsite using reverse engineering using CATIA. It will also discuss a process simulation workflow that can be used to validate the integrity of a safety related component. This paper will show, through workflows and examples, how design and analysis tools like CATIA and Abaqus/CAE can be utilized for above stated scenarios. In summary the paper will show how to: 1.) Perform FFS level 3 analysis of in-service components using laser scan data, coupled with design and FEA tools. 2.) Additively manufacture, using reverse engineering, an obsolete but critical component onsite, employing design tool.

Dassault Systèmes

Breaking Barriers by Improving Collaboration Between Design and Simulation with Connected Engineering on the 3DEXPERIENCE Platform

Joe Asmar, CATIA Industry Process Consultant, CATIA Engineering

Demonstration of real-time associativity enabled by the 3DEXPERIENCE platform between Design and Simulation regardless of the CAD source (CATIAV5, SOLIDWORKS, NX, CREO

etc...).In this session we will walk through a collaborative engineering change process scenario demonstrating a typical "day in the life" of a group of mechanical designers and analysts collaborating on the 3DEXPERIENCE platform.

Dassault Systèmes
Integrated Project Team Collaboration with 3DEXPERIENCE Platform
Joe Baldwin, SIMULIA Senior Sales Representative
Having FEA tools inside a CAD environment is nothing new. What is new is how the DS 3DExperience platform provides continuity and commonality from simple Designer level checks through simulation expert led deep investigations. The ModSim demonstration will show Design Engineers and Stress Experts working jointly in the same data environment to rapidly study a proposed design change.

Dassault Systèmes
Robust Design: Paradigm Shift in Technology
Brad Heers Director, SIMULIA IPS, Structures Industry Process Expert
Today's integrated platform approach brings together advanced simulation and design exploration technology to drive a paradigm shift in design thinking. No longer will a company need to roll the dice in debuting a new product. Instead, the product can be exhaustively simulated in all states and all conditions to determine how well it will perform and reduce the business risk associated with production.

Dassault Systemes
Interactive Simulation-Driven Design Guidance with DesignGUIDE
Christopher Lee, Portfolio Technical Specialist, PowerFLOW Automated Post-processing and Optimization
Manufacturers developing vehicles and products must innovate in response to rapid industry transformations, satisfy heightening consumer expectations, and meet all cost, quality, and regulatory requirements on time. Integrating simulation in the development process is critical to successfully meeting performance targets. However, traditional simulation results analysis generally does not directly indicate how design changes will impact performance. In addition, design decisions can be largely driven and constrained by aesthetics, not only performance. Finally, the performance objectives of different engineering teams are often in conflict. These challenges inevitably lead to suboptimal design decisions, missed performance targets, and development delays. DesignGUIDE is a new capability in the SIMULIA PowerFLOW suite that provides a novel way to address these challenges. In this presentation, we'll examine how DesignGUIDE can be used to interactively connect simulation performance KPI's directly with design, provide intuitive design guidance to drive collaboration with styling departments, and enable consideration of multi-disciplinary trade-offs. We'll present multiple examples of how the technology can be used across different industry processes across the transportation and mobility, aerospace and defense, and industrial equipment industries, including a multi-disciplinary customer example.

Dassault Systèmes

Automated Cloud Solutions for Airflow Optimization and Acoustic Certification

Rachana Rao Mallyala, SIMULIA Industry Process Consultant

Engine cooling is a challenge across industries, such as Automotive and Industrial Equipment. Many equipment manufacturers focus mainly on meeting engine certification at a specific ambient temperature without realizing there is potential for additional airflow. A typical combustion engine generates a significant amount of heat, of which around 35% to 40% must be dissipated by the engine cooling system. The fan and fan shroud are critical components of the engine cooling system as they provide the necessary airflow through the engine radiator required to take the heat away from the coolant. In addition, the design of fan and fan shroud must meet packaging space requirements, which can increase the complexity of the cooling system. By maximizing the performance of fan and fan shroud, the cooling system can be improved through an increase in airflow, or a better distribution of the airflow across the radiator. Both improvements can lead to a reduction in fan speed, a reduction in fan power, longer operational life and possibly lower operating cost. Through exploration of a design space, leveraging optimization analysis, the impact of fan and fan shroud design parameters on the total airflow can be investigated to achieve optimal performance without constraining the design change to simple iterations from a baseline. This is even more critical when the equipment manufacturer is utilizing molded fan shrouds, as the optimal design must be achieved before implementing the costly initial mold tooling. With a better understanding of the key shape parameters early in the development schedule, the need for multiple tests and iterations late in the development schedule can be removed, reducing the number of molds to ideally just one. Additionally we can leverage the information related to thermal and aero-acoustic contributions to achieve the multi-objective optimal design of fans with a single solution. In this study, a series of design of experiments and optimizations of a fan and fan shroud were performed on an excavator to achieve optimal cooling airflow. The fixed design space for this engine cooling system covered design parameters such as tip clearance, fan to radiator distance, fan shroud depth and curvature and fan shroud ring depth. The performance of the system is assessed using a Lattice Boltzmann-based Method known for its best-in-class accuracy at predicting cooling performance. The final configuration of optimal design shows a 15% improvement to the initial one and illustrates how most machinery with similar configurations of fan and fan shroud can leverage such optimization approaches to help reduce total development time and cost. We further evaluate the noise contributions for both the baseline and the optimal solution to digitally certify the design for sound power levels, using an automated process that conforms to ISO 6393.

Enabling IoT with Electromagnetics Simulation

3M

EM Waveguiding through HDR (High Dielectric Resonator) Metamaterial Array for Wireless Wearable Application

Jaewon Kim, Research Specialist

The technology proposes metamaterial(MTM)-based electromagnetic (EM) wave guiding channel material using high dielectric resonators (HDRs). HDRs, which resonate at an interesting frequency band, are embedded with a specific lattice constant in any substrate whose dielectric constant is relatively lower than HDRs. HDRs are made out of high dielectric constant materials. EM waves can propagate more efficiently though this EM wave guiding channel material. This presentation will talk about how to improve on-body communications using the proposed EM wave guiding channel material. In other words, wireless smart on-body sensors are connected to each other without electrically conductive wires. Sensor can communicate like as wired sensors through the EM wave guiding channel material garment put on body with the improved data security.

Collins Aerospace

Design & Simulation of Di-Electric Resonator Antenna for Satellite Communication

Ramlal Bharath Jammalamadaka, Lead Engineer

Antenna is an electrical device which converts electric energy to radio waves and vice versa. It is used with Radio Frequency (RF) Transmitter and Receiver. An Antenna is used for sending or receiving Electromagnetic (EM) Waves. The Di-electric Resonator Antenna (DRA) is a type of radio antenna. It is the block of a dielectric material mounted on a surface. A Rectangular DRA with probe feed is designed & simulated works in the frequency of 1.621 GHz for satellite communication, This DRA has a frequency coverage of 1.57 to 2.13 GHz, bandwidth of 560 MHz. The required polarization for this antenna is RHCP (Right Hand Circular Polarization). This model is designed & simulated in CST Microwave Studio and analyzed under FDTD (Finite Difference Time Domain) & FEM (Finite Element Method). The antenna parameters like Return loss, VSWR, Impedance Plots, Gain and Radiation patterns are recorded and compared in both FDTD & FEM.

Continental Automotive Singapore Pte Ltd

Virtual Twinning – The Next Chapter of EMC Design

Wang Lin Biao, Expert – High Speed Electronic Simulation

As we progressed into the mid of 2020, do you have the knowledge and awareness of what are the 25 or even 20 technological trends that will define our organization's success. A lot of hype has already been generated around "Artificial Intelligence", "Machine Learning", "Big Data", "Autonomous Vehicles", and "5G". In this presentation, one of the defining technological trends – "Digital Twinning", will be discussed. But in today's context, I would

prefer to rename this as "Virtual Twinning" instead. Why "Virtual Twinning"? Firstly, a digital twin is applicable to a product, process or even an eco-system. However, a virtual twin encompasses more than modeling, simulation, information intelligence and collaboration. It brings also biosciences, material sciences and information sciences to project the data from an object into a complete living virtual model that can be fully configured and simulated. Virtual twinning will enable engineers and designers to perform alternations that would be expensive or risky to try out. The basic idea is not new. It is simply using 3D modelling to create a virtual representation of the object. Depending on the field of applications, various multi-disciplinary simulations can be performed. Coupling with exponential increase in computing power, it has led to substantial decrease in cost of designing, solving problems and testing of the virtual object as compared to the physical one. With this it will further empower the designers to be virtually limitless, and the only limitation is one's imagination and creativity. Cost-benefits analysis of EMC (electromagnetic) simulations and measurements will be discussed. This is then followed ideas and strategies to spur growth in this field. Lastly, some examples where EMC modelling of the test setup and product will be presented. By combining, science and technology, it makes it possible to make the invisible visible. Through powerful 3D field visualizations and virtual prototyping, locating, understanding and solving the problem was made possible a holistica.

Sivantos GmbH (WSAudiology)

Modeling and Simulation of Electromagnetic Susceptibility (EMS) issues in Hearing Aids

Andreas Bauch, Product Development Professional - Wireless

Modern Hearing Aids are powerful computers with a lot of digital and sensitive logic inside. They must fulfill many standards regarding Electromagnetic Compatibility (EMC) to avoid any impairment of function in the presence of electromagnetic interference caused by others. In the context of an Electromagnetic Susceptibility (EMS) measurement (e.g. required by the IEC 60118-13) of a hearing aid in development it was found that a ground bounce occurs at 2.5GHz. The cable connecting the loudspeaker electrically with the hearing aid was identified as the main cause of the ground bounce, as the effect no longer occurs without this cable. Unfortunately, the exact coupling into the hearing aid and the effects on the PCB could not be determined during measurement. Hence also the possible counter measurements that could be implemented to solve this issue were unclear. To determine the exact cause of this undesired effect and possible solutions, a 3D model of the hearing aid was built and refined until the supposed resonance could be displayed. In Fig. 1 the model of the hearing aid is shown, and Fig. 2 shows the corresponding E-fields of the unwanted resonance. Due to simplifications of the model, the simulated and measured resonance frequencies are different which is ok to understand the physical effects. The starting point of the model was the brd file exported from Allegro. This file contains the lumped components (L, C, R) used, the copper layers, the substrates of the PCB, the PCB outline, and the bending radii of the PCB. By using the EDA Import filter a bent PCB is created with minor mesh adaptations only. The missing components of the hearing aid, such as the receiver cable and its holder, were included into CST as stp files and provided with the corresponding electrical

properties. To excite the external field at the beginning the Plane Wave Excitation was used to stimulate the simulation. Later a waveguide was defined via the boundary conditions which sped up simulation significantly. The first simulations showed too many resonances, which could not be verified in the measurements. Therefore, the hearing aid was measured in the field of a real waveguide and the results were used to further refine the simulation model. After the rough determination of the material parameters, further components were added to the simulation model until the desired resonance at 2.14GHz was finally visible. With the help of the CST model it is now possible to investigate the resonance in more detail and to evaluate possibilities for its suppression. For example, measurements and simulations have already shown that placing a ferrite foil at a certain location strongly dampens the resonance and thus suppresses it.

Caelynx

Effective Methods for User Defined Meshing in CST Microwave Studio

Jim Reed, Senior Engineer for Electromagnetic Applications

A key benefit of CST Microwave Studio is the broad selection of high frequency solvers from two general based solvers, Time Domain with hexahedral meshing and Frequency Domain with tetrahedral meshing, as well as special purpose solvers including the Integral and Asymptotic which are both triangular surface meshing. We will review user defined meshing methods and best practices as well as solver settings that affect the mesh quality and solution convergence, and how reproducing results in different domains and meshing techniques can contribute greatly to the confidence in simulation results.

Microwave Vision Italy

Benefits of Combining Measurements and Simulations for Antenna Applications

Lucia Scialacqua, Scientific SW Department Engineer

In numerical simulation of antenna problems, accuracy of antenna representations is strongly required for guaranteeing the reliability of the results. Integration of measured data in Computational Electromagnetic (CEM) solvers opens up new perspectives at this scope. When the simulated antenna model is not available (for example in case of on shelf antennas), it is possible to measure the real antenna and to use its measured model, that represents the real antenna after testing. No additional information about mechanical and/or electrical design of the measured antenna model are required by the CEM tool using this procedure, since the measured model in terms of equivalent currents completely represents the antenna. The MVG INSIGHT software, containing a wide variety of features for measurement post-processing (diagnostics, improvements of the measurement set-up and many other applications) allows to investigate measured data and to prepare the measured model of your antenna. The measured model, maintaining the near and far field properties of the measured device, is usable in numerical simulations by CST Studio Suite as an accurate 3D electromagnetic source. In this presentation the benefits of combining measurements and simulations will be shown for different antenna applications.

Vayyar Imaging

Breast Phantom Simulations with CST: Analysis of Ideal Antenna Arrays for Medical Imaging

Reut Wizenberg, R&D Engineer

Breast cancer is the most common form of invasive cancer in women worldwide. Early detection is crucial to successful treatment outcome. Microwave breast imaging is a novel non-ionizing, painless, low-cost, and mobile technology for early detection of breast cancer. In this presentation we will demonstrate an innovative approach for using CST to examine propagation of EM waves through human breast tissue as part of the development process of Vayyar imaging's early-stage breast cancer detection device. CST simulations of complex anatomical phantoms excited with broadband, well-sampled, ideal antenna arrays are used to evaluate different array design parameters' contribution to resulting 3D image of breast interior.

Keio University

Integration of Terahertz Radar Based on Leaky-Wave Coherence Tomography

Yasuaki Monnai, Associate Professor

The use of terahertz waves for ranging and detection offers a higher resolution and smaller aperture as compared to the microwave radar. However, despite the recently emerging terahertz sources and detectors, integration of a phased array radar system is still challenging due to the lack of phase shifters and circulators. Here we present a method to integrate a terahertz radar system without using them based on a pair of reversely connected leaky-wave antennas. It paves the way to a compact terahertz radar system for a wide range of applications such as security check, health monitoring, drone avionics, and human-computer interface.

Loughborough University

Mirostrip Patch Antenna Array

Harold Thieba, Student

A study carried out to investigate how a 4x4 patch antenna array operating at GHz frequencies can be designed and how its different configurations affect beam direction, shape, and width is presented in this dissertation. In this experiment a 4x4 antenna array was designed using two FR-4 substrates separated by a copper ground plane. The patch antennas sat on the top substrate and were connected to a corporate feed network on the bottom substrate by probes. The feed network was designed to ensure each patch is excited simultaneously so that they are equal in phase and amplitude, in order to produce a very directive signal (pencil beam). A second design using coaxial feeding for each patch was also created to run simulations for different configurations of the antenna array. An antenna CAD software, CST Studio Suite 2019, was used to design the arrays and run their simulations. The simulated gain (IEEE) of the complete antenna array and its directivity were 18.51 dBi and 18.71 dBi respectively. Its return loss was -37dB with a bandwidth of 101 MHz and a half power beam width (HPB)

Nanyang Technological University

Modelling and Simulation of Electro Magnetic Pulse (EMP) Generator with CST Microwave Studio

Shan Han, NA

Simulation using CST Microwave Studio Suite is used to study the effect of structure dimensions on a Electro Magnetic Pulse (EMP) generator. The CST simulation is performed with high voltage (HV) being applied to the various electrodes and a single fast switch used for discharging to initiate the EMP generation. The fast switch is made of photoconductive semiconductor switch (PCSS) device and is modeled as a discrete excitation voltage source with a time dependent resistance. When PCSS device with variable conductivity model is used, the DC port then used to apply the HV to the structure in simulation. The DC port HV timing profile and the switching profile (PCSS variable conductivity model) become important for the simulation. Step profile will excite oscillation and should be avoided. Switching profile should be based on the characterization of the PCSS device for accurate simulation results. 5ns smoothed ramped DC port profile and PCSS variable conductivity model are established with CST simulation. The modeling and simulation of CST help to understand the fundamental principle of the EMP generator and optimize the design with realistic setting (closer to prototype).

University of St. Andrews

High Sensitivity Probe Design for Electron Paramagnetic Resonance Optimized Using CST STUDIO SUITE

Yujie Zhao, School of Physics and Astronomy

Electron Paramagnetic Resonance (EPR) is an important technique used for the study of materials containing unpaired electrons. It deals with the interaction between electromagnetic radiation and inherent magnetic moments in the sample and provides information about material properties and molecular structure. Much work has been done to improve EPR absolute sensitivity, with single spin sensitivity seen as the ultimate target. However, in most practical EPR experiments concentration sensitivity is often far more useful and important, and this requires a very different design approach. The aim of this work is to design an EPR probe with a large concentration sensitivity enhancement with CST STUDIO SUITE simulation tool. Similar techniques also have potential to improve Dynamic Nuclear Polarisation (DNP) probe design, which can then be used to enhance the signal-to-noise ratio for Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI) applications. NMR and MRI are both massive markets with $1B annual sales on liquid state NMR and $1B annual sales on contrast agents for MRI. Sensitivity enhancements offered through improved probe designs for both EPR and DNP have the potential to access these markets.

ShanghaiTech University

Reducing Mutual Coupling of MIMO Antennas by Mode Manipulation for 5G and WiFi-6 Applications

Fenghan Lin, Assistant Professor
A method is proposed to suppress the unwanted higher order modes (HOMs) of the metasurfaces in multiport antenna systems for improving the radiation performances using CST characteristic mode analysis (CMA). The proposed method is to control the modal currents under consideration by loading the unit cells of the metasurface with slots and vias. The positions of loads are determined with the aid of CMA of the metasurface. For proof of concept, the proposed technique is applied to a compact wideband four metasurface antenna (MA) systems operating at 5 GHz Wi-Fi bands. With the suppression of HOMs, the split and tilted radiation patterns of the MAs are significantly improved. The concept is experimentally validated for potential compact multiport antenna applications.

Dassault Systèmes Deutschland GmbH
5G Private Network Design in a Smart Factory Environment
Marc Ruetschlin, SIMULIA High Tech Strategic Initiatives Portfolio Technical Expert
Modern high-tech factories are large, complex and dynamic environments which require ultra-reliable high performance wireless communication networks to make them "smart". Electromagnetic simulation is an essential tool for the design of a robust wireless communication infrastructure. Using simulation to ensure reliable connections, that are resilient to factory reconfiguration and the movement of equipment and people, is the topic of this presentation.

Enhanced Performance with Multidisciplinary Modeling & Simulation

Dimensional Control Systems
The Digital Twin Powered by Model Based Engineering
Gary Bell, Sr. Dimensional Engineer
Demonstrate how simulation in the 3DEXPERIENCE Platform provides a true Digital Twin, allowing for the simulation of dimensional properties and tolerance stack-ups that provide feedback on design specifications.

Bridgestone
Tire Exterior Noise Advanced Simulation
Gerardo Del Guercio, R&D Engineer
Tire noise performance turned out to be a crucial one in the last years and for the years coming, challenging all the automotive field. Bridgestone tackles the overall tire performance optimization with a solid virtualization strategy. One of main focus is on tire exterior noise virtual prediction. This project presents the effort to adapt Wave6 technology to this target showing results obtained for a practical case study.

Nikola Motors

Personal Watercraft Dynamic Analysis Using CEL

Juan P Martinez, CEA Specialist

I am in charge of doing the structural analysis of the WAV. I am doing a Coupled Eulerian Lagrangian analysis in Abaqus to understand the dynamic loads imposed to the vehicle by the dynamic interaction between the water and the WAV i.e. a) WAV impact into the water from a 2 mts jump.b) WAV hitting a water wave while going at full speed fwd.The objective of the analysis is to better understand the characteristics of the dynamic forces/stresses imposed by the water in the vehicle to optimize the structural design for durability and safety. Using a CEL simulation allows us to incorporate the dynamic behavior of the water and model the water-watercraft interaction to understand how the loads are being absorbed and transmitted through the watercraft vehicle. This analysis will impact the design of the watercraft, and will highlight areas in which structural reinforcement is needed. Will help identify the required thicknesses for the main hull and mid/top deck layers. Will also serve as a guide to design the metal structure which is taking the main load from the battery, engine and passagers, as well as the design of the attaching/joints fixtures.

Toyo Tire

Introduction of Tire Design Base Technology Utilizing 3DEXPERIENCE Platform

Hayato Yogou, Assistant Manager

A tire is a complex structure consisting of multiple rubber and fiber materials, and developing it using only empirical rules would take a lot of time and cost. Therefore, we has been developing tires using CAE. With competition for technological advances in next-generation mobility such as EVs and autonomous driving, tires need to rapidly achieve clear performance and functionality to support the evolution of mobility. In this presentation, we introduce new approaches to analysis and prediction using SPDM, which can create a database by connecting CAE data with design and test data.

Digital Product Simulation

Tolerance Analysis of Flexible Assemblies: An Effort to Integrate Engineering & Manufacturing Challenges

Adrien Doux, Simulation Method & Tools Consultant

Traditional tolerance analysis assumes rigid parts and is often performed very early in the engineering development process when part manufacturing or overall assembly process are not yet determined. Most frequently, the manufacturing process shall be assessed in the latest stages of design, or even worse, shall the design be modified to handle manufacturing issues causing leadtime and additional costs. The presentation introduces virtual testing Method & Tools effort to perform flexible assembly simulation more efficiently in the context of a co-design approach between Engineering and Manufacturing departments.Tolerance analysis of flexible parts generally requires a mathematical model for calculating part deformations, as well as forces and internal stresses due to assembly. To predict such as-

sembly results, the parts may be modelled using a finite element model with appropriate information such as geometry, including default prediction when required, boundary conditions representing tooling or fastening and assembly sequences as defined by the manufacturing.Thus, not only an accurate prediction of the physics with a specific effort to reduce computation time are necessary, but also an efficient collaboration and communication between engineering disciplines are required. Ideally, in the context of a flexible tolerancing approach, state-of-the art assembly process simulation capabilities have to be well integrated and available "on-demand" to quickly solve any engineering or manufacturing issues that could arise.The presentation will emphasize specific use, implementation and benefits of the 3DEXPERIENCE platform to manage such simulation method and bridge the gap between engineering disciplines.In this part of the presentation, some approaches to standardize and automate simulation methods will be presented as well as future challenges to integrate disciplines more tightly."

VIAS

Design of Dish Antenna Under Extreme Wind Event – A Coupled Flow-Structural Approach using XFlow and Abaqus

Murthy Lakshmiraju, CFD Director

Wind loading on dish antenna is an important parameter in designing the antenna structure for communication integrity. The concave shaped reflector surface is the key component for the communications and the deformation caused by wind loading could potentially affect the resolution and sensitivity of the antenna performance. Wind loads and corresponding deformations on the surface can be estimated accurately through one-way coupled Fluid Structure Interaction (FSI). The proposed work involves CFD analysis on a commonly used parabolic dish antenna to determine the maximum loading on the dish antenna. The wind loads and drag coefficients will be estimated for different wind angles to determine the direction of the maximum loading on the dish surface. For maximum loading condition, pressure distribution on the dish surface will be used as an input condition to estimate the maximum surface deformation using FEA analysis.The one-way coupled FSI study will be performed using Dassault Systèmes SIMULIA XFlow and Abaqus.

Beijing Institute of Technology

SIMULIA Enhanced Electromagnetic Design and Analysis

Yuming Wu, Associate Professor

SIMULIA enhanced electromagnetic design and analysis SIMULIA is able to provide highly virtual prototyping, hence having plenty of helpful solutions in various area. Taking advantage of the object and model based 3DEXPERIENCE platform and inter-disciplinary design space optimization, integrated antenna design can be tested and evaluated for compliance especially in the practical operation environment. Take SIMULIA electromagnetic simulation as an example, it is capable of accelerating the development and increasing the reliability by maximizing the usage of virtual validation in antenna engineering and certification

applications. In this talk, some of the popular developments in SIMULIA enhanced electromagnetic design and analysis will be reviewed and reported such as Luneburg lens antenna, metasurface, and wearable antenna. As an import candidate in the interfacial engineering, metasurface is promising for manipulating the electromagnetic wave (light) and providing novel optoelectronic functions and applications. Our work paves a roadmap to design sophisticated and advanced integrated optical/THz/Microwave devices, with low dimension, miniaturization, high performance and multiple functions.

Western Michigan University

Investigation of Bridge Substructure Damage Potential during Lateral Slide Activities

Upul Attanayake, Director, MDOT Center of Excellence for Structural Durability

To reduce disruption to traffic during bridge replacement, accelerated bridge replacement (ABR) methodologies are being developed. One of the ABR methodologies being implemented is slide-in bridge construction (SIBC), which reduces the total duration of traffic disruption to less than one or two weekends. Because the SIBC activities are new, the system response is unknown. Quantification of the loads acting on permanent structures during the slide operation is required. With this purpose, substructure movements were monitored during an SIBC project in Michigan, USA, and the forces acting on the substructure during the slide operation were back-calculated. The Abaqus FEA was used to investigate the substructure response under sliding loads. A 3D model with soil-structure interaction was used for this investigation. This presentation describes bridge slide activities, instrumentation and monitoring of bridge substructure, and the pre- and post-processing of the 3D soil-structure interaction model in Abaqus FEA to investigate the structural response during the slide.

Dassault Systemes

Co-Modeling & Co-Simulation Collaboration on the 3DEXPERIENCE Platform - A True Collaborative Scenario

Rohit Bhardwaj, CATIA Industry Process Consultant, CATIA Mechanical

With COVID-19 restrictions, many engineers realize how powerful the 3DEXPERIENCE Platform is for working concurrently in a data-driven environment. With current pressures on competitive time-to-market, engineers need to fast track the never-ending check-ins/check-outs, revision management and other time-consuming processes. The same way we embrace collaborative technologies in our daily life (such as Facebook, LinkedIn, etc.), the 3DEXPERIENCE Platform streamlines key engineering processes with collaboration.

In this session, you will learn how design engineers and simulation engineers can harness the co-modeling and co-simulation capabilities of the 3DEXPERIENCE Platform to accelerate time-to-market.

Dassault Systemes

3DEXPERIENCE Pass-By Noise +Tread Meshing

John Lewis SIMULIA IPS, Industrial Equipment, Industry Process Expert

This session discusses how an early adoption of Dassault Systèmes offerings reduces the risk of non-compliance during physical testing by using virtual tests/experiments early in the design stage to understand the sources of radiated sound from the tire. By performing accurate and robust virtual tests (i.e. experiments that truly predict reality) early in the design cycle, tire manufacturers can reduce physical prototype tires (i.e. check tires), reduce physical prototype molds, increase productivity and improve time to market. Specific applications covered include parametric tire design and pass-by noise estimation.

Dassault Systemes

Design of Robust, Safe and Reliable Switchgear with Electro-Thermal Numerical Simulations

Adrian Scott, SIMULIA IPS, Industrial Equipment, Industry Process Expert Senior Specialist

Switchgear, comprising fuses, disconnect switches and circuit breakers is a vital element in a reliable power system and enables the isolation, disconnection and protection of electrical equipment. It also enables safe maintenance by cutting power to circuits and components in the system, clearance of downstream faults and switching electrical supply from a network power system to a local power generation system. Such critical equipment has a typical lifespan of at least 30 years and must be robust with low failure rates. As well as conformity with internationally devised and accepted IEC standards, more recent environmental regulations, "green energy", have increased the demands on the manufacturers and designers of such equipment. There are many aspects to these standards and regulations which encompass many physical aspects in the design process - mechanical, electrical and thermal. The costs of testing for conformity and product cycle development can be radically reduced by the aid of numerical simulation. Unnecessary tests which may be difficult to perform, be destructive and dangerous may be removed from the design cycle. Switchgear design must adhere to temperature limits, amongst many other requirements, determined by international IEC standards. In order to accelerate the design process, simulation must be able to emulate the physical process according to well-known principles.To maximize the benefit of simulation, it is critical to include it in the design process. Radical departures from well-known designs may be investigated. The aforementioned challenges in the market may lead to risky and costly changes which can result in fatal operational performance. Simulation can reduce dramatically this risk. An Electro-thermal simulation enabling these benefits is demonstrated on a typical switchgear component. The CST Studio Suite allows, within a single user-interface, the designer or analyst to perform a combined electromagnetic field (CST EM STUDIO) and Conjugate Heat Transfer (CHT) simulation workflow on a single, fully parameterized CAD model. Data exchange between the simulation types is automatic. A typical switchgear design and possible improvements are subjected to this workflow in order to test for thermal conformity.

Dassault Systemes

Modeling and Simulation of a Front Loader Washing Machine in 3DEXPERIENCE and Simpack Through PowerBy Approach

Nikhil Sharad Walunj, SIMULIA R&D quality assurance specialist

This presentation showcases the cooperation and interaction of a front loader washing machine modeling on the 3DEXPERIENCE platform and simulation on Simpack. The key aspect here is the 'PowerBy' approach. It shows how the model created on the 3DEXPERIENCE platform can be exported to Simpack along with all its geometries, knowledge-ware parameters, mass, inertia data and axes systems. It demonstrates as well how the Simpack simulation results can be saved to the 3DEXPERIENCE platform so multiple users can easily review it. This cooperation of technologies will not only demonstrate the possible saving of time and effort users and companies experience, but also the advantages of using the Dassault Systèmes disciplines compared to the use of conventional modeling and simulation softwares and their limitations with sharing of models, knowledge-ware parameters and results.

Improve Real-World Performance with Structures Simulation

Ford Motor Company Engineering Lab

Robust Electrical Rotor Design Driven by Simulation with Abaqus

Min Jie, CAE Engineer

The presentation will include 3D nonlinear rotor FEA modeling with ABAQUS. The model is applied to analyze rotor durability with more accurate calculation of stress and deformation. The nonlinear model can also be applied to rotor vibration analysis and be correlated with test.

Nisshinbo Brake Inc.

Study of Creep Groan Simulation by Implicit Dynamic Analysis Method of FEA (Part 2)

Katsuhiro Uchiyama, NVH Analysis Sec. Technology R&D Dept.

We built new "Creep groan" simulation model focusing on disc brake parts such as slide pin, PWI (Pad Wear Indicator), PSC (Pad Support Clip). Using this model, we tried parameter study. We figured out that PSC spring constant affected to "Creep groan" performance, so the results are reported together with vehicle test results.

Trelleborg Antivibration Solutions

Simulation and Validation on the Idealized Mullins Effect For Antivibration Design Using Hyperelastic-Dissipation Approach

Robert Luo, Principal CAE Engineer

The complete loading–unloading–deflection response is a key requirement for the antivibration design, the upload portion normally provides the stiffness value and the unload portion

can give the damping information. In engineering applications, this response is referred to the idealized Mullins effect. Abaqus has included this effect in its solver. As the parameters provided in Abaqus do not linked to measurable physical properties of rubber, however, the method is not user friendly. The presented hyperelastic-dissipation approach is to relate the Mullins Effect to a measurable physical property, i.e., rebound resilience. The hyperelastic models have already widely used in industry. A key finding is that the complete loading–unloading response can be obtained realistically using the value of the rebound resilience without any data fitting procedure. The engineering cases have shown that this approach can predict the Mullins response well through Abaqus capability. The suggested approach is validated and can be used in the antivibration applications.

EuroFusion

Simulation of Blanket Drop Accident in a Fusion Tokamak Reactor

Pouya Haghdoust, CAE & Structural Integrity Specialist

The DEMOnstration power plant (DEMO) is a concept for an electricity-producing, tritium-generating, long-pulse tokamak. With DEMO project, fusion will go from a science-driven, lab-based exercise to an industry-driven and technology-driven program. The blankets of the DEMO Vacuum Vessel (VV) serve as neutron shielding and breeding devices for tritium. These blankets have limited lifetime since they operate in neutron-irradiated environment. Their replacement is necessary and should be foreseen in the maintenance schedule of DEMO reactor. Removal and replacement of blankets are done from the top by crane-like devices. One of the risks, during this operation, is accidental drop of blanket on the VV, which may cause damages on the VV inner and outer shells. Considering the safety confinement function of the VV, a safe design of VV should guarantee the outer shell integrity in such condition to avoid the emission of radioactive substances. This study simulates the free-fall drop of one inboard blanket module on the VV using Abaqus/explicit solver. The aim of the simulation is to evaluate the outer shell integrity when the blanket is dropping on VV. To do so, different drop configurations with different heights and VV impact points were investigated. In all cases the inner shell of the VV failed with large deformations and rupture in the impact zone. The outer shell instead, holds its integrity despite of large deformations.

Tan Tock Seng Hospital

A Pre-Surgery Study of Intertrochanteric Fracture With Distal Extension Of Lesser Trochanter Fragment To Estimate The Performance Of Short Proximal Femoral Nail Antirotat

Wu Chean Lee, Department of Orthopaedic Surgery

The advancement of computational and simulation technology has empowered the engineering community to enhance productivity and design innovation. However, the benefit of simulation technology has yet to be fully capitalized by medical practitioners for diagnosis, pre-surgery planning, post-surgery performance predictions and forensic investigation. This study indicates additional insight provided by simulation technology could help medical practitioners to make informed pre-surgery planning and implant selection. The lesser trochanter (LT) fragment in the multifragmentary intertrochanteric femur fracture (AO 31A2.2)

may extend distally. If the fragment extends too distally, fixation with a short proximal femoral nail antirotation (PFNA-II) device may not be sufficient. The exact length of distal extension that can be tolerated by the short PFNA-II is not known, therefore it is our objective to determine it. A finite element modelling is developed using SIMULIA Abaqus, based on AO 31A2.2 fracture fixed with a 200mm length size 10 PFNA-II. The parametric study was performed to investigate the failure point of the implant with various sizes of LT fragment. The stiffness, maximum vertical reaction force, and the plastic deformation area were investigated. In both non-osteoporotic and osteoporotic models, the stiffness and the maximum vertical reaction force of the construct dropped significantly when the LT fragment is larger than 40mm. Beyond 40mm of LT fragment size, there was a rapid increase in the area of plastic deformation of the cortical bone distal to the intertrochanteric fracture, signifying structural failure of the construct. This means when fixing the multifragmentary intertrochanteric fracture of the femur with the PFNA-II device, a long nail should be considered if the lesser trochanter fragment extends 40mm distal to the distal base of the lesser trochanter.

Bureau of Economic Geology, Jackson School of Geosciences

Fault Reactivation in Response to Saltwater Disposal and Hydrocarbon Production for the Venus, TX, Mw 4.0 Earthquake Sequence

Mahdi Haddad, Postdoctoral Fellow

Man-made earthquake footprint has recently expanded to several states in the US due to petroleum industry operations. The spatial and temporal correlation of these earthquakes with hydrocarbon production and associated injection of produced water into reservoir units has promoted further scientific studies on their causative mechanisms. These earthquakes within the upper brittle crust occur along preexisting geological faults which become unstable due to the combined effects of production from unconventional reservoirs and saltwater disposal into adjacent layers. This combined effect results from poroelastic stress changes can be captured through geomechanical models that fully couple fluid flow and poroelastic response. To assess the potential for fault reactivation in response to wastewater injection and hydrocarbon production, we conducted fully coupled 3D poroelastic finite element simulations in Abaqus for a site-specific induced seismicity case in Texas. Conducting this research was feasible only via parallel-processing option and direct solver in Abaqus due to the computational demand and nonlinearity of the problem in this work. The possibility to work with Abaqus on computational clusters at Texas Advanced Computing Center was essential because of the necessity to conduct simulations for a parameter space in order to address uncertainties in the hydrogeological description of subsurface formations.

University of Eastern Finland

A Subject-Specific Muscle Force Driven Fibril-Reinforced Poroviscoelastic Finite Element Model of the Knee Joint

Amir Esrafilian, Junior Researcher

Our research group mostly focus on development of the subject-specific finite element model of the knee joint. We use Abaqus software along with the UMAT subroutine for the finite element analysis. The aim of the research that I would present was to evaluate how different activities and exercises alter the mechanical responses on the knee joint cartilage. At the end, the cartilage degradation algorithm (implemented via UMAT subroutine as well) would be used to estimated knee osteoarthritis onset and progression. The UMAT subroutine is used to implement the fibril-reinforced poroviscoelastic material mode of the knee cartilages and menisci, and the Soils (consolidation) analysis was used. I do believe that the presentation could be found informative for those who are interested in utilizing advanced material models along with complicated boundary conditions, surfaces and numerous contact pairs, as well as biomechanical applications of the finite element analysis.

Universidad Militar Neva Granada

Numerical Behavior of Thin Walls

Juan Carlos Castro Medina, Docente asistente tiempo completo de la facultad de ingeniería

Hysteretic curve measured during shake table tests of a thin and low-rise wall with shear web reinforcement made of deformed bars is compared with the hysteresis curve computed using the Abaqus/Explicit-Fortran Compaq software. Boundary conditions of the experimental test are initially defined. The constitutive continuity equation that is able to characterize the mechanical behavior of the thin entire walls reinforced with concrete and bars, and the boundary conditions of the numerical model are encaste into the base and displacement on top. The paper shows the damage constitutive not work conservative model in the vumat subroutine of Fortran. Measured and computed curves force vs displacement are finally compared and discussed.

Universiti Teknologi Malaysia

Damage Mechanics Approach to Fatigue Life Prediction of Steel Wire Ropes under Fretting Fatigue Conditions

Mohd Nasir Tamin, Professor (Mechanical Engineering and Applied Mechanics)

The reported premature failures of steel wire ropes, commonly employed for offshore mooring and hoisting applications, are likely due to the accumulated damage under fretting fatigue, fretting wear and/or corrosion fatigue conditions. The conventional design against fatigue failure is based on the experimentally established strength-life curves of the stranded wire ropes. In this respect, this paper proposes an alternative approach employing damage mechanics concept for improved reliability prediction of the steel wire ropes. This presentation considers the failure of the stranded wires by the fretting fatigue conditions. The methodology is based on the computed local stress field in the critical trellis contact zone of a stranded wire rope by the FE simulation, and the measured degradation of the Young's modulus of the drawn steel wires. The fatigue damage model is adapted from the Lemitaire's damage equations for quasi-brittle material with a damageable micro-inclusion embedded in an elastic meso-element. The incremental fatigue damage calculations employing the load-cycle block is described. The routine is integrated into Abaqus FEA software

through user-define subroutine (UMAT). A case study employing a single strand (1×7) steel wire rope subjected to axial tension fatigue loading is illustrated. The validated methodology is ideal for rapid generation of the reliability data for fatigue life assessment of newly-designed steel wire ropes.

Light Weight Engineering

Airbus

Simulation Environment for Virtual Fatigue Testing of Additive Manufacturing Part

Ismael Rivero Arévalo, Aerospace Mechanical Engineering

Additive Manufacturing (AM) application for aerospace industry presents a significant potential to provide substantial benefits such as shorter development process and time to market, weight-optimized designs and on-demand spares manufacturing. Regarding the aircraft structural integrity, a key aspect in aircraft design, certification and operation is the presence of complex patterns of defects such as lack of fusion or multiple pores and voids, which are intrinsic to AM process and can potentially produce a major detrimental effect in the fatigue strength of AM metallic parts. These defects are processdependent and largely variable, therefore dedicated characterization and analysis is required. Nowadays, industry efforts to consolidate a reliable behavioral modeling of AM components focus on three main areas: (i) physical testing to build comprehensive databases of AM materials performance and behavior (ii) statistical data treatment to enable stochastic approaches for AM materials (iii) development of high-fidelity numerical models for Virtual Fatigue Testing (VFT) Airbus DS is developing these VFT simulations for AM metallic parts based on the Continuum Damage Mechanics (CDM) formulation at the defect and coupon scales, in order to predict the effect of AM defects over fatigue strength. This VFT simulation environment is being developed and implemented in the software PAMDEMIC (Probabilistic Additive Manufacturing DEfect Modelling for Initiation of Cracking), created by Airbus DS, using Simulia Abaqus as core FE solver with add-ons based on user's subroutines for CDM behavioral modeling and Python scripting for parametric generation of characteristic AM defects and results post-processing. PAMDEMIC is able to launch Montecarlo CDM simulations in order to perform a probabilistic evaluation of the expected fatigue life for AM metallic parts, allowing the determination of the corresponding life limits or maintenance tasks required to assure the structural integrity during the service life of the part.

Joby Aviation

Composites Engineering - Integrating Modeling and Simulation

Dana Frye, Structural Analyst

This session will cover the unique combined capabilities for composites design and simulation on the 3DEXPERIENCE platform, going through the setup of a composites part in the CATIA apps, sizing and optimization, and faster maturation of the composites definition from preliminary to detailed design stage, thanks to the SIMULIA Structural Analysis apps. This session will also highlight the collaboration capabilities available for the composites De-

sign Engineers and Stress Analysts, enabling to leverage a common 3D Composites definition as a single source of truth from requirements to production. Joby Aviation who successfully implemented such as an approach through the development of their revolutionary eVTOL will be presenting use cases and feedbacks related to their workflow for Composites Design and Simulation.

SKA

Topological Optimization in Quadcopter Model Using Finite Element Method for Additive Manufacturing

Jose Filipe Trilha de Carvalho, Head - Departamento de Engenharia CAE e CFD

In order for a quadcopter to be able to perform a mission, his structure must support the loads of the mission's activities. However, a heavy structure directly impacts the performance of this aircraft. In this way, this article aims to execute a structural design for a remotely piloted aircraft using modern mass reduction and manufacturing techniques such as topological optimization and additive manufacturing. The proposed quadcopter must support the mass of all components, loadings imposed by the motor thrust and a camera as a payload with a 150 gram. Thus, the first step performed was the requirements analysis to determine what is necessary for the execution of the proposed mission, this step allowed to select all the components that make up the aircraft and, therefore, start to create the CAD nominal model. Subsequently, the initial structural design was performed using the finite element method. The first structural calculations aimed to validate the nominal geometry in relation to the loading conditions imposed by the motor thrust. The initial structural validation allowed to proceed with the topological optimization of the aircraft component directly responsible for engine loading. The objective function imposed was to minimize the mass and the restriction of 1.2 times the nominal displacement. The optimized model was manufactured via additive manufacturing and, as a result, a total mass of 36 g was obtained, i.e., the component mass was reduced by 45.5% what results in a reduction by 75% of safety coefficient. Therefore, the topological optimization and additive manufacturing allowed to manufacture a new structural with lower mass.

Optimal Device

Simulation is Child's Play, Broken Toys Aren't

Rob Stupplebeen, CEO

This is a case study of multiple knit line failures on the popular fidget spinner toy. This toy's geometry has been reverse engineered to create suitable geometry for a variety of simulations and redesigns. From an injection molding standpoint, the three lobed design, with 4 holes allow for a deceptively difficult molding problem. Knit lines are inevitable but where should the gates be located and where will the knit likes be located? Injection molding simulation is used to investigate a variety of gate locations and the use of multiple gates. Once the molding technique has been selected what can be done to maximize the strength of the part without deviating too far from the iconic design? Finite element analysis is performed to simulate the stresses induced through press fitting of the bearings. The simulation was

carried out by having the bearings in place using contact with removing overclosures. This method is more computationally efficient than pressing the bearing in which would include sliding contact. The bearing insertion causes hoop stresses in each lobe. These stresses put the knit lines in tension which causes part failure. We will assume that the locations and sizes of the bearings are fixed and the outside diameter for ergonomic reasons. This sets the allowable design space for the redesign. Topology optimization was then used to evolve the design to maximize strength and stiffness while minimizing weight and cost, creating a design suitable for 3DPrinting.

Singapore Institute of Manufacturing Technology (SIMTech)

Non-Deterministic Geometric Defects and Robust Design of Additively Manufactured Lightweight Lattices

Stefanie Feih, Senior Scientist and Group Manager with the Singapore Institute of Manufacturing Technology

The rapid development of additive manufacturing (AM) technologies enables the realization of lightweight and multi-functional lattices. Meanwhile, geometric defects are inevitably introduced during AM processes, affecting the overall performance of printed parts. The influence can be prominent for lightweight lattices due to their numerous fine features. Unlike deterministic defects such as over-sizing and under-sizing which can be predicted and addressed by geometric compensation, non-deterministic defects such waviness and thickness variations follow statistical distributions and results in a statistical range of the performance. The prediction the statistical range is of great importance for robust designs of AM lattices which are less or in-sensitive to geometric defects. In this work, we study the lightweight strut and shell lattices whose constitutive features are sub-millimetre slender struts and thin walls, respectively, fabricated by selective laser melting techniques. Geometric defects are characterized by micro computed tomography and the non-deterministic part is modelled by statistical distributions. Based on the metrology results, we develop finite element models with statistically distributed geometric variations using Abaqus and analyze the defect sensitivity of imperfect lattices on their mechanical properties. Numerical results reveal the robustness of the lattices with AM induced geometric defects and help with the identification and optimization robust lattice designs.

DEES / UFMG - Department of Structural Engineering

One Parameter for 3D Elastic Constants of Carbon Composite Laminates

Carlos Cimini, Professor

In every single simulation, analysts face the necessity to input the material elastic constants into their models. It may not be difficult for some people to determine 3D stress and strain fields for laminated composite materials. However, with so many elastic constants to input, it is difficult to know their values. It turns out that the Tsai's modulus in 2D [4] can be extended to 3D in a straightforward fashion. As a result, there exists a master ply from which one solution is sufficient for all materials by scaling with Tsai's modulus [1-4]. This modulus

is the trace of the elastic stiffness in C that is modified to take into account the use of engineering shear moduli; thus, Tsai's modulus = C11 + C22 + C33 + 2C44 + 2C55 + 2C66. In Figure 1, comparison of 3D universal stiffness C* and 2D universal stiffness A* for laminate [02/±45] shows the invariance of their components as function of the trace for 11 different CFRP material systems. Both were normalized by Tsai's modulus. It can be seen the marginal increment of universal stiffness for the 3D case and also that the master ply concept can be applied to both ply stiffness C* and laminate stiffness A*.The 3D laminate stiffness A* can be also partitioned to a fraction of its components. It turned out that the in-plane stiffness components correspond to 86% and the remaining out-of-plane, 14%. Figure 2 shows these 2D vs. 3D proportions of 3D stiffness A* for 15 different CFRP material systems considering several layups. The accuracy is less than 2%. Experimentally it is only necessary to measure one constant, i.e., the Tsai's modulus, from which all diagonal components of the 3D stiffness can be scaled, with 2% accuracy. There are other invariants that can used to determine the off-diagonal components with the same degree of accuracy. The bottom line is, with the recognition of the existence of the Tsai's modulus for 3D stiffness, confidence in the stress analysis is increased and solution based on one material can be scaled for all other CFRP. There is no need for recalculation. Moreover, master ply concept relies on one-parameter input: the unidirectional ply longitudinal modulus (Ex), which defines the Tsai's modulus and, therefore, the particular CFRP material system.

UMASS Dartmouth

Part Distortion Simulation in Additive Manufacturing: A Machine Learning Framework - Part I

Osama Aljarrah, Graduate Research and Teaching Assistant

The complexity of multi-physics systems inherited from the additive manufacturing (AM) technology erected difficult challenges to validate the simulation models grounded from the finite elements analysis (FEA). The spatiotemporal different thermal cycles lead to a residual stresses and non-uniform part distortions within the additively manufactured part, which could detrimentally impact its adaptation in functional applications. Moreover, the conventional modeling using partial differential equations (PDEs) implemented through FEA are mitigated by the massive numerical calculations and exhausted by the system's curse of the dimensionality. In this study, a data-driven modeling approach was developed to effectively simulate the distortion within the additively manufactured part. The part distortions history was collected from different AM building strategies using finite element simulations. The FEA model consists the multi-layer part distortion as targets, in respect to AM process parameters. The novel theme consists of two stages: (1) self-organized map (SOM) to project the high-dimensional spatial for the part distortion into likelihood estimator, (2) Hybrid self-organizing model to predict the extracted feature and reconstruct the part distortion manifold. The data-driven model allows evaluating different build strategies and their effect on the distortion for the additively manufactured part, the results agreed well with FE simulations and continued to establish a proper compensation strategy.

Convergent Manufacturing Technologies Inc.
Composites Manufacturing & Process Simulation
Paulo Silva, Engineer - Numerical Methods
Many industries, including aerospace, automotive, and energy, are facing multiple challenges related to the design and manufacturing of composite components. As parts become more complex, and materials continue to advance, new automated manufacturing methods have been developed. While the automation of these new processes helps reduce variation and overall production cycle time, they can be difficult to accurately simulate. This is why Dassault Systèmes and Convergent Manufacturing Technologies have teamed up to develop an integrated workflow that allows designers and manufacturing engineers to simulate the composite forming process with disruptive, yet scalable software technologies. Convergent manufacturing technologies is leveraging their expertise using numerical approaches with Abaqus in composites manufacturing process simulation, such as curing simulation, liquid composites molding simulation (RTM and others), and complex composites forming process. This presentation will highlight key advanced composites modelling and simulation tools dedicated to the forming manufacturing process, and provide a deep dive into the integrated workflow using Convergent's software technologies and the CATIA Composites Forming solution.

Dassault Systèmes
Structural Generative Design - Part 1
Colin Swearingen, CATIA Industry Process Specialist Consultant
Generative design is a new practice leveraging various optimization methodologies to create parts that are requirement-driven and designed to specification. In this session, you will see an overview of Dassault Systèmes' structural generative design solution, including learning about the steps required to setup and run optimizations on concepts for both traditional and additive manufacturing. In addition, we will look into how the Dassault Systèmes offering leverages trade off studies to enable the user to look at multiple concepts and make educated decisions on which solution best meets the requirements.

Dassault Systèmes
Structural Generative Design - Part 2
Tonya Cole, Senior CATIA NAM Industry Process Consultant
In this session, we will build on what we learned from part 1. You will see an overview of Dassault Systèmes' additive manufacturing solutions, including learning about the steps required to setup and run optimizations on concepts to aid in designing for additive manufacturing. In addition, we will look at multiple use cases where structural generative design is helping designers efficiently create the optimal shapes for additive manufacturing.

Register

Dassault Systèmes

Technology Update on Additive Manufacturing Simulation

Steven Ribeiro-Ayeh, A&D Strategic Initiatives Senior Portfolio Technical Specialist

This presentation covers 2020x/2021x updates to the additive manufacturing simulation technology in the 3DEXPERIENCE platform, and the Abaqus solver. The attendees will learn about the new Distortion Checker application, the new pattern-based thermal method, usability enhancements, and updates on microstructure simulation

Modeling & Simulation from an Industry Perspective

BMW

A Holistic and CAD Enabled Approach to HVAC Design: Using Simulation to Optimize Noise Comfort and Defrost Performance

Jan Biermann

Amidst a changing automotive industry, where consumers are expecting continuing improvements around autonomous and electric vehicles, OEMS are racing to provide brand defining transformations in cabin comfort and safety. The cabin of a car is becoming a new living space, where the demands on comfort and passenger experience are unprecedentedly high, but must at the same time verify legal road requirements. Satisfying all these cabin requirements during the vehicle design used to be a question of compromise, where for example the validation of legal requirements for the defrosting of the windshield often meant compromising on noise levels. With holistic SIMULIA fluid solutions however, interior noise sources from the Heating Ventilation and Air Conditioning Unit (HVAC) can now be reduced whilst verifying legal windshield defrost requirements through simulation of ice presence. In this presentation, we will show how PowerFLOW and PowerTHERM are used to design the HVAC of a BMW cabin whilst optimising noise levels and verifying legal defrost requirements. In order to generate innovative geometries, we will also show how a fully parametric duct design from CATIA v5 can be integrated in the optimization, allowing for a large and comprehensive design space.

Novo Nordisk A/S & Technical University of Denmark

Extreme Parameter and Design Exploration with FEA Variation Simulation

Tim Brix Nerenst, Industrial Ph.D. Student

The presentation introduces a case study in which FEA combined with Design of Experiments (DOE) results in a probabilistic approach for evaluating the output of a design subject to geometric variation of twelve parameters, with the goal of optimizing three conflicting functional requirements. Output consists of defining and estimating important parameters, translating the FEA to analytical terms, i.e. meta-models, conducting Monte-Carlo simulations to estimate the output failure rate.

Hyundai Motor

eCorner Module Concept Design and Vehicle Dynamic Analysis

Dohyun Kong Research Engineer

Urbanization is one of the great issues in some megacities that road is more congested and parking lot is too crowded. A vehicle with 4-Wheel independent steering (4WIS) could be one solution to such problem; one can drive through small alley with smaller turning radius or escape the parking lot by moving sideways. eCorner module (consists of suspension, steering, brake and in-wheel motor system) can steer each four-wheels in a way to provide special driving mode such as driving side-ways or rotation in one spot. Using virtual vehicle development process, eCorner module and 4WIS vehicle motion are under study and analysis. The main goal is to build a kinematically stable structure and find safe driving concept of special driving mode without making a real car.

Tadano

Real-time crane simulator for sensory analysis - Unwavering challenge for new value creation

Hiroki Ichikawa Chief, Advanced Technology Research Center

The sensory analysis is an important factor in the evaluation of human-machine interactions for construction equipment. Although digital technologies such as 3-D CAD and CAE have been used at the design stage in product development in our company, no human sensory analysis had been performed until a prototype was manufactured. In order to carry out human sensory analysis at the design stage, we developed a real-time crane simulator by using multibody simulation software, Simpack. In the presentation, we will give an overview of the simulator and examples of new functions developed using it.

4WEBMEDICAL

Biomechanical Evaluation of Hip Instrumented with a Patient Specific HemiPelvis Truss-Based Implant: A Computational Modeling Analysis

Ali Kiapour, Senior Principal Engineer

Chondrosarcoma is a type of bone tumor characterized by the malignant growth of cartilage-producing cells. When chondrosarcoma occurs in the pelvic region, there are a plethora of surgical methods to treat it. Surgery in the pelvic region is particularly challenging due to the complex anatomy of the region, deep exposures, and narrow safe corridors, but treatments for pelvic chondrosarcoma including excision, hip arthroplasty, and hemipelvectomy are possible [1, 2, 3]. After performing hemipelvectomy, a pelvic reconstruction procedure is necessary to fill the void left behind if the tumor resection requires negative margins that impede into the pelvic bone. Pelvic reconstruction procedures can include structural allografts with internal fixation, saddle prostheses, ice cream cone prostheses, modular prostheses, and computer-aided design (CAD) prostheses reconstruction surgery [4].The advent of 3D printing has dramatically changed the process behind hemipelvectomy. No longer do patients have to suffer through the drastically low survival rates (27% for five years after sur-

gery, mean survival time 32.8 %4.6 months), acute and chronic pain, and wound complications characterized by older, more traditional hemipelvectomy procedures, nor do they subject themselves to the impending complications and limited function associated with other reconstructive procedures, like allografts, bone grafts, osteosynthesis, or saddle prostheses [5, 6]. Rather, patient-specific, 3D-printed implants allow the opportunity for optimized bone ingrowth surfaces, can perfectly match a certain patient's pre-existing anatomy, and allow for osseointegration at the connection points between the bone and implant [1, 7]. In the long run, using a 3D-printed prosthesis gives better patient outcome and maximizes a patient's quality of life after the procedure has been completed. The objective of this study is to evaluate the biomechanical effect of the patient specific truss-based Hemipelvis implant on pelvic segment.

Applus IDIADA

Subjective Comfort Evaluation using Simpack

Iván Mula Vivero, Project Manager, Chassis Simulation & Driving Simulator, Vehicle Dynamics & Toyota Motor Europe, Bianca Bivona, Engineer

Comfort is becoming the key performance attribute for vehicle dynamics: the driving task is increasingly becoming automated and this is allowing drivers to value how relaxed and comfortable they feel in the vehicle. However, comfort development is still a big challenge: it requires a driver to feel and validate high fidelity prototypes, prototypes that must typically have a high level of maturity and are therefore usually only available at the later stages of vehicle development. At IDIADA we have been working in collaboration with Toyota Motor Europe on one solution: that of taking the development of ride comfort to a virtual environment using our dynamic driving Simulator. Virtual ride comfort development requires a complex high-fidelity vehicle model of running in real-time. We will go through both the modelling process on Simpack to achieve a vehicle model capable to run in real-time with enough fidelity to evaluate comfort, and its integration on our state-of-the-art driving simulator capable of precisely replicating accelerations with high amplitude and frequency response in all directions. The process will show how to significantly cut the physical development of prototypes whilst at the same time maintaining the same level of performance as that of real testing. Subjective feedback of professional drivers confirms that a rich and complex ride can be felt at our simulator, especially when driving on our high-definition road models.

Abbott Labs

Living Heart Human Model with Accelerated Heart Rate and Applications

Shawn Chen, Staff Engineer

Computational heart modeling is a valuable tool to simulate heart hemodynamic behavior and to evaluate medical devices such as leadless pacemakers. The Living Heart Human Model (LHHM) is a commercial, four chamber heart model in which the dynamic behavior is regulated by physically realistic mechanical, electrical and fluid physics. The LHHM model outputs detailed stroke volume, blood pressure and timings information during cardiac cycles. LHHM can also accurately simulate the hemodynamic performance of the heart during

exercises for heart rates ranging from 90-160 beat/min. For a paced heart, heart rate changes are not controlled by autonomic nerve intervention, and often are not associated with excise and changes in body oxygen requirements. As a results, the hemodynamic behaviors of the heart would be different for a paced heart from that of a heart during exercise. Furthermore, the amount of pre-programed AV delay also has large impacts on the hemodynamic behaviors of a heart during pacing. The objective of this study is to quantitatively measure the differences in hemodynamic behavior between paced and exercised hearts using LHHM, and to study the effects of AV delay on cardiac performance. This study demonstrates how simulation can provide additional clinical insight into the relationship between heart rate and physiological characteristics such as contractility, body resistance etc.

Xihua University

Collaboration of Bridge Design and Simulation

Yongyi Yang, Professor-level Senior Engineer

The integration of models in different LOD and FEM into template. Upgrade and downgrade LOD of models and FEM. The Reinforcement calculation in any kind of section.

Dassault Systèmes

Industrial Non-Parametric Sensitivity Based Shape And Bead Optimization For Large And Plastic Deformations

Sinan Gezgin, SIMULIA R&D Developer Specialist, Non-parametric Opt

Abaqus simulations of misuse load cases for chassis parts is an effective and validated tool for ensuring the mechanical quality of many automotive applications. One critical measure is to restrict plastic strain to below 3% for misuse load cases. It is possible to minimize plastic strain using non-parametric shape optimization based on optimality criteria methods [1]. However, it is not possible to constrain the plastic strain to below a certain value. In latest versions of SIMULIA Tosca and Abaqus (versions r2020xHF1 and above) we propose a gradient based optimization method to overcome this limitation. The solution we present calculates adjoint sensitivities of models with rate independent non-linear elasto-plastic material using von-Mises yield criterion with isotropic hardening under large deformations within Abaqus. This enables us to do industrial non-parametric shape and bead optimizations, which to our knowledge have not been done before using any commercial or academic software. We present some industrial automotive models of chassis parts where plastic strain plays an important role in driving the design optimization. To calculate plastic strain adequately, industrial finite element models often contain many special simulation features such as displacement driven loading, contacts, multipoint constraints, couplings and various types of finite elements such as finite strain shell elements or surface stress integrated solid elements. Optimizations presented also include other commonly industrial applied constraints such as volume, stiffness and eigenfrequency constraints. We present results for a single part as well as assemblies consisting of many parts.

Dassault Systèmes

Improving Efficiency and Reliability in Industrial Equipment by using Simulation to Drive Gearbox Lubrication Design

Gabriel Pichon, Industry Process Solution Specialist, SIMULIA APAC

Heavy mobile equipment customers are asking for improved efficiency, reliability, and versatility when shopping for machinery. More recently, and to cope with high purchase costs, market trends have even been shifting to usership instead of ownership. In this service based model, OEMs must ensure that machinery is operating at peak efficiency, and without downtime. This, combined with greater demand for customization and reduced development times, is pushing OEMS to evaluate new development methodologies to design more reliable products faster. Verifying the correct lubrication of powertrain components, such as gearboxes, has always proven a difficult experimental task. Translucent acrylic parts would need to be built specifically for testing, and quantitative data proved hard to come by. With XFlow simulation solutions from SIMULIA however, accurate quantitative data about the lubrication of complex rotating geometry can easily be obtained. In this presentation, we will show how the lubrication of an industrial equipment gearbox can be improved by verifying the impact of design changes made directly on the **3D**EXPERIENCE platform. We will look at wetted surface and churning loss to assess how these changes impact reliability and efficiency of the gearbox system.

Dassault Systèmes

Simulating Air Flows in Different Hospitals in the Context of COVID-19 risk

Emmanuel Vanoli, SIMULIA EMEAR Industry Process Consultant Senior Specialist

Understand the air flows and therefore the potential direction of virus propagation in different floors of the hospitals. Provide guidance to put in place the sanitary measures and potentially readapt the building layouts. Communicate an appropriate prevention plan. This presentation will explain how, thanks to the Virtual Twins of the hospitals and SIMULIA have been able to provide help during the pandemic.

Dassault Systèmes

Virtual Twin Experience for Geomechanics

Gerard Alcini, CATIA Industry Process Expert Consultant

Mechanical Earth Models (MEMs) are finite element models that provide a first-principles physics-based description of an Oil and Gas field, describing the regional variations of stresses and strains throughout the field operational history. The MEMs are derivations of the subsurface modeling activities, tying information from multiple subsurface disciplines such as: geophysics, geology, petrophysics and reservoir engineering. Due to the nature of the geological data used as input to create the MEMs, the process of creating suitable finite element models is fairly manual, tedious and time consuming, with typical lead times in the order of months. A novel CAD-based workflow using Dassault Systèmes modeling technology is show cased in this presentation. The 3D shape modeling technology from Dassault Systèmes CATIA is proven to rapidly and efficiently recreate a CAD-based description of the oil and gas field, reducing modeling cycle time to a few days. The CAD-based 3D model of

the field is subsequently taken through the steps to fully define a finite element model using Dassault Systèmes SIMULIA technology. The results of the model are presented following industry standards, making the interpretation of the model outputs rather trivial, with suitable technology able to democratize access to the model results by non-specialists.

Dassault Systèmes

Interpreting Ambiguity - Dassault Systèmes' Commitment on Results & Value for Customer Business: An Introduction of Outcome-Based Engagement Approach

Lionel Burgaud, WW Outcome-Based Engagement Vice President

Nowadays, companies from any industry have to take a risk to achieve business transformation and efficiency improvement and to face complex industry challenges. By using the outcome-based engagement model and offering new forms of collaboration, Dassault Systèmes becomes a strategic business partner. On one hand, risk-sharing/value-sharing software business models, and on the other hand engineering services play an important role. Join this expert session and learn more about the approach.

Dassault Systèmes

Industry Solution Update: A Review of Reservoir Subsurface Simulation Technology Extensions

Bernd Crouse SIMULIA IPS, Energy & Materials Industry Process Expert Director, E&M Enablement, SIMULIA E&M Enablement

In this presentation recent multi-scale and multi-physics technology and workflow extensions to better characterize and operate hydrocarbon reservoirs will be reviewed. A focus is set on a new ModSim workflow for Geomechanics solutions which is set to address today's customer challenges when operating hydrocarbon reservoirs.

Dassault Systèmes

Large Assembly Handling, Concurrent Engineering & Collaboration

Jeff Heath, CATIA NAM Senior Industry Process Consultant

Join Joe and Jeff in this new normal of working remotely in the most effective way. This typical "day in the life" of a group of designers highlights the power of the **3D**EXPERIENCE platform for large assembly management, concurrent engineering and collaboration.

Dassault Systèmes

Large Simulations For Optimization With High Performance And High Accuracy

Anton Jurinic, SIMULIA IPS Structures Industry Process Expert

Recently, several advances have been done for the Abaqus Multi-Grid (AMG)-based iterative solver addressing large-scale simulations with high performance and high accuracy [1]. The AMG solution is implemented for both the primal systems of structural equations as well as for the adjoint systems for the sensitivities. Thus, the present solution addresses industrial large scale designing challenges, e.g. if one can 3D print a minimum size of 0.5 mm and the

design space is 20x20x20 cm then a minimum finite element resolution of 64 million elements is required. For such models, designers expect a relatively fast turnaround time and a relatively small amount of memory consumption. The presented AMG solution allows for realistic simulation and thereby, realistic optimization as unstructured and arbitrary meshes can be simulated including modelling of contact (penalty & augmented Lagrange method), gasket elements, pre-tension sections, tie constraints, MPC, kinematic couplings and rigid bodies, symmetry and periodicity boundary conditions, as well as a large number of boundary conditions. Several industrial design applications will be shown, including a powertrain example of an engine block meshed with ~15 mio elements, ~13 mio DOFs, non-linear preloading and multiple service load cases. Results for traditional manufacturing constraints (casting) and additive manufacturing will be presented.

Dassault Systèmes

Industry Solution Update: Industrial Equipment

Adrien Mann, SIMULIA Industry Process Expert Director, Industrial Equipment

The pandemic has created challenges for the industrial equipment industry, with both the difficulty to sustain production outputs, and a reduction in product demand, affecting both Original Equipment Manufacturers (OEMs) and Suppliers. However, the pandemic has also exposed resiliency bottlenecks such as dependency on physical tests, or inefficiencies in product development. Accelerating digital transformation is a path for the industry to remove these bottlenecks. The massive response of our industry to support the shortage of medical equipment was one of its best illustration. Modeling & Simulation solutions from Dassault Systèmes are here to enable and support this digital transformation.

Dassault Systèmes

Pushing the Boundaries of Wind Turbine Engineering

Steve Mulski, SIMULIA IPS, Wind Energy Executive, Industry Process Expert

This presentation will cover the key challenges wind turbine manufacturers and suppliers are facing in today's challenging market, and will show how simulation is being used to optimize products on multiple levels, including costs, noise, and time-to-market.

Dassault Systèmes

Industry Solution Update: High-Tech

Jonathan Oakley, Director, High Tech Industry Enablement, SIMULIA

The high tech industry has remained robust though the COVID-19 pandemic with demand for consumer devices and related areas remaining strong. In this presentation we'll look at the challenges in meeting increasing consumer expectations while at the same time reducing product time-to-market. We'll look at how end-to-end processes, early-stage simulation and virtual prototypes all play a role in ensuring final products meet performance and regulatory KPIs. Design of experiments, optimization and trade-off analysis across structural, electromagnetic, thermal and fluids domains will be considered as critical drivers for optimal products delivered on schedule.

Dassault Systèmes

Industry Update: Aerospace & Defense

Francesco Polidoro, Director, Aerospace & Defense, SIMULIA Industry Process Success

The COVID-19 pandemic has reshaped the demand and affected all players in Aerospace and Defense. The presentation will cover the new challenges of the industry, from rebuilding the passengers' confidence to the need for a more sustainable air journey. End-to-end processes, early-stage simulation and virtual prototypes will play a key role in how the industry will bounce back by meeting performance and regulatory KPIs.

Dassault Systèmes

Conceptual Sizing Optimization for Urban Air Mobility

Vishal Savane, A&D Strategic Initiatives Portfolio Technical Specialist

This presentation covers a unique conceptual sizing optimization workflow for an eVTOL (electric vertical take-off landing) vehicle design utilizing the 3DEXPERIENCE platform (CATIA xGenerative Design, Fluid Dynamics Engineer, Structural Analysis Engineer, and Process Composer). The benefits of this workflow include parametric design logic directly used for simulation, multiphysics simulation within the same interface, and combining parametric and non-parametric simulation to determine the optimal design at the conceptual stage.

Dassault Systèmes

3D Mechanical Earth Model of the Volve Field using a Modeling and Simulation Workflow

Zhuang Sun, SIMULIA IPS, Energy and Materials, Industry Process Expert Specialist, SIMULIA E&M Enablement

The Volve field is a North Sea oil field with a complete set of subsurface and production data made available by Equinor. We construct the 3D mechanical earth model of the Volve field as follows: (1) create the CAD representations of the interpreted horizons and faults, (2) generate the finite element mesh, (3) create overburden rock physics model based on the seismic velocities and well logs, (4) calibrate appropriate constitutive models with mechanical tests performed on the core samples, (5) incorporate the reservoir model forecast of pore pressure history, and (6) assign finite element model attributes. We perform geomechanical assessments using ABAQUS and compare the simulated reservoir deformation with the 4D seismic survey of the Volve field. The Volve field is publically available (containing over 40,000 files), and this work integrates real data of the seismic survey, well logs, cores, reservoir model, etc. As compared to other modeling technologies, the presented modeling and simulation (MODSIM) workflow (1) makes the process of model creation more efficient and streamlined using currently available tools on the 3DExperience platform, (2) facilitates the model creation to many users and enables the scalability of the solutions, and (3) maintains the 3D mechanical earth model synchronized with geophysical interpretations and revisions to the geological subsurface models. This workflow provides physics-based solutions to

complex structural models, complements reservoir simulation in the production stage, and potentially creates savings across the entire asset lifecycle.

Dassault Systèmes

Updates on Transportation and Mobility Solutions

Edward Tate Sr. Director, SIMULIA Industry Process Success

The pace of design in transportation and mobility continues to increase. One of the keys to keeping up with this pace is considering the entire design and analysis process from end to end. In many cases, the time required to iterate a design is dominated by case setup, post processing and decision making. This session will provide an overview of advances for T&M with an emphasis on structures and aerodynamics solutions. In addition to process improvements, two unique capabilities that advance ModSim, DesignGUIDE and the Denso ECM library will be highlighted. DesignGUIDE offers a new way to gain insights about a design and drive change. The Denso ECM library makes it possible to select and integrate a detailed engine cooling module into a simulation in minutes. Attendees will learn about the latest advances in ModSim that can be applied to their challenges.

Dassault Systèmes

Industry Solution Update: Life Sciences

Stuart Wright, Industries Process Expert

The Life Sciences industry is an especially exciting industry for simulation today! The rates of adoption and integration of simulation into product development business processes is accelerating as the industry starts to more aggressively capitalize on the opportunities that simulation represents. Strongly motivated by the needs to control ever increasing development costs, to minimize patient risk, and simultaneously innovate new therapies, the industry is trying to change its physical test dominated model to one that relies on a more equitable balance of physical and virtual validation methods. We support this; the regulatory bodies support this; and the industry needs this!

Reveal & Shape with Fluid Simulation

A2Mac1 Automotive Benchmarking

Robust Simulation with SIMULIA PowerFLOW for Car Aerodynamics Benchmarking through Virtual Wind Tunnel.

Vincent Keromnès, 3D Dynamic Benchmarking Domain Leader

A2Mac1 is the leader in the Automotive Benchmarking market. All OEMs worldwide are connecting to A2Mac1 Innovation Bench Platform to consume competitive data. Thanks to a rigorous and high quality part by part scanning process we are able to provide the full DMU of hundred new vehicles every year. This presentation will highlight how 3DS SIM-

ULIA PowerFLOW team together with A2Mac1 has been able to develop a robust and efficient process to deliver high quality aerodynamics data in a very short amount of time starting from A2Mac1 3D scanned data.

Parker Hannifin

Fluidic Generative Design for Additive Manufacturing

Suchi Rajendran, Modeling & Simulation Engineer

With the newest trend for optimization technology being flow optimization, there are a new set of challenges to understand and address, such as finding feasible flow paths that form complex networks throughout a product, while ensuring consistent flow efficiency. Additionally, simulation plays a critical role in understanding and assessing the manufacturability of these parts. This session will cover:

- Potential use cases and industries who can benefit from flow optimization
- The challenges and benefits of flow design and optimization
- Deep dive into an end to end flow optimization case study, including an assessment of the methods available to simulate the additive manufacturing process of the part

Volvo Trucks North America

GHG2: Build Variation Study, Scripting to Handle 2000+ Specs

Raja Sengupta, Lead Engineer- Aerodynamics

For aerodynamic certification under GHG2, a large number of vehicle specs had to evaluated. This was accomplished in a reasonable timeframe by leveraging the scalability and flexibility of SIMULIA Cloud to automate and drive 2000+ PowerFLOW simulations. In addition, to quantify the compliance risk from physical truck build variation, a characterization study was carried out using the Optimization tools offered within SIMULIA.

Volvo Trucks North America

Virtual Development of DOE Supertruck2 - Simulation Driven Aerodynamic Design

Raja Sengupta, Lead Engineer- Aerodynamics

This presentation will cover multiple aspects of the aerodynamic development of Supertruck2 in a fully virtual environment using PowerFLOW. Iterative design of a sub-system, as well as optimization of add-on devices with focus on complete vehicle aerodynamics will be presented.

Nexen Tire

Tire Aerodynamic Development Cases using PowerFLOW

Yongsu Kim, Research Engineer

This is a study that predicts the aerodynamics performance of a tire using PowerFLOW. The drag coefficient according to tire shape changes was predicted and analyzed, and the reliability was reviewed by analyzing the test data and its trend. It also explains what NEXEN TIRE will study further using PowerFlow.

FAW Jiefang Group Co., Ltd. Commercial Institute

The application of CFD in Commercial Vehicle Research and Development

Genghua Liao, Chief Fluid Dynamics Engineer

CFD is widely used in automotive product development. The ratio of CFD work in vehicle research and development continues to expand. CFD activities of the vehicle are mainly divided into two numerical simulations of outflow and inflow. Outflow is the outer flow of vehicle geometry, like aerodynamics and Vehicle Thermal Management (VTM). Inflow is the inner flow of vehicle geometry, like Engine combustion and heat dissipation, lubrication of gearbox and drive axle, the pipe flow and noise of Intake & Exhaust System and HVAC. It's a privilege to take this opportunity to share our CFD works in vehicle R&D of FAW-Jiefang.

Same Deutz Fahr

Agricultural vehicles development through virtual testing and validation

Marco Scotti R&D Engineer

Sophisticated and complex technologies are more and more implemented in nowadays agricultural tractors to achieve even higher performance in compliance with severe emission legislation. Diesel engine systems, such as the external cooled Exhaust Gas Recirculation (ecEGR) and the indirect Charge Air Cooling (iCAC), Continuously-Variable Transmissions (CVT) and tractor auxiliaries are demanding a higher cooling capacity to the vehicle cooling system. Usage of these high technology systems with compact underhood packaging together with bulky exhaust after treatment systems and vehicle requirements, led to an unconventional approach to the cooling system development and to a need of a flexible vehicle thermal management to fulfill the real life operating conditions.

Dassault Systèmes/Charles Machine Works

A Directional Drill's Fan Shroud Design and Optimization to Maximize Cooling Airflow and Monitor Aero-Acoustic Trends

Ani Rajagopal Solution Consultant

As a long-standing PowerFLOW & SIMULIA Cloud customer, The Charles Machine Works Inc. has constantly tried to drive their designs with high fidelity and realistic simulations within the fluids domain. With similar intentions, The Charles Machine Works Inc. approached SIMULIA's Industry Process Success team with the objective of maximizing the airflow through the heat exchangers in a new directional drill concept to optimize under-hood thermal performance. The Charles Machine Works Inc. was also curious to know how this influences the aero-acoustics of the machine, as the design moves progressively towards the optima in the study. The shroud optimization workflow on SIMULIA Cloud uses the shroud shape parameters and fan immersion as variables to search the design space using stage-dependent algorithms to maximize the objective function. Since this is a single environment workflow, users can create simulation data points, submit these simulations and analyze preliminary results within the same environment. After feeding the design parameters, constraints and objective into the workflow, 33 designs in total were evaluated over the course of the study in three stages – Design Space Creation, Design Space Exploration and Design Optimization.

Although the objective of the study was to maximize the cooling airflow, each design was also monitored for its aero-acoustic performance. The best designs were then picked from the pseudo-Pareto front. At the end of the study, the design space was thoroughly searched with 33 data points at a fraction of the cost and turnaround time of executing physical tests.

Exhibitor Showcase

CAE Softsys, Inc.

Accelerating Simulation Adoption & Usage for Product Development Processes

Greg Flaute, Director

Often stated, "The Only Constant In the World Is Change", and for today's product development teams, from small-to-large and from local-to-global, this change has often meant "Process Acceleration and Then More Acceleration". With the continuous advancements of compute power, integrated applications, digital-twins and client deliverability requirements, advanced simulation technology has now matured to become an achievable and required strategic process capability to be leveraged earlier and more-fully across both the product development and full-enterprise teams. However, the availability of the right analysis resources and processes continues to be a common limiting factor. With this presentation, we will share several techniques for training, mentoring and force-multiplying new and advanced simulation analysts and teams, democratizing advanced simulation methods, justifying the development of virtual test labs, exploring and optimizing designs, and efficiently sharing simulation results across the teams to enable better, faster, and less-costly data-driven decisions, new product releases, and real-world validations.

Caelynx

3DEXPERIENCE: A CAE Paradox How I've Been Doing More Engineering with Less Work

Marcel Ingels CAE Engineer

As a simulation engineer for a CAE consultant, I spend a lot of time in pre-/post- tools, and over the past year, **3D**EXPERIENCE has become my tool of choice for simulation. In this talk, I'll be demonstrating the variety of ways **3D**EXPERIENCE has impressed me and allowed me to do FEA faster and easier than I was accustomed to when coming from other tools from both DS and competitors.

DataPoint Labs

Material Testing, Model Parameterization, and First Step Validation for FEA

Peter Garson Technical Sales Engineer

Physically accurate simulation is a requirement for initiatives such as late-stage prototyping, additive manufacturing, and digital twinning. The modelling of nonlinear behavior of materials for Finite Element Analysis (FEA) can be challenging: difficulty of obtaining pertinent material data, to the correct parameterization of this data into the input files needed by FEA. Too often, the material models are limited and fail to adequately describe the observed material behavior, having been developed for a different material. DatapointLabs discusses

its experience helping FEA engineers gain confidence in their material inputs to allow for simulation to replicate real-life physical behavior. The use of mid-stage validation has been shown to be a valuable tool prior to use of simulation for prototype design. Factors such as simulation settings, element type, mesh size, choice of material model, the material model parameter conversion process, quality and suitability of material property data used can all be evaluated. These validations do not use real-life parts, but instead use carefully designed standardized geometries in a controlled physical test that probes the accuracy of the simulation. With this a priori knowledge, it is possible to make meaningful design decisions.

Endurica

Endurica Rubber Fatigue Workflow Enhancements for 2020: Ageing Effects, Road Loads, Digital Twins and more!

Will Mars, President & Founder

Endurica fatigue solver capabilities have expanded significantly in 2020. If you work with elastomers and durability, come see the latest features and workflows! These include: ageing effect co-simulation with evolving stiffness and crack growth rate curve properties, digital twin for rubber parts, periodic results transfer for tire models, input file include and encryption features, new output requests, binary file format for large analyses, viewer enhancements and more. Also, come see our live demo of real-time fatigue calculations for a pogo-stick digital twin. Our twin integrates 3 axis load measurements (Fx, Fy and Fz) obtained in-situ on the pogo stick via strain gauges placed with Wolfstar's True Load tool. Remaining life of the rubber pogo stick tip is computed in real time with the Endurica DT and EIE tools, and is then displayed for the user.

Inceptra

Simulation Data Management and Traceability with the 3DEXPERIENCE Platform

Peter Duckworth, Director of Simulation

Learn how the new Simulation Process Engineer role leverages the simulation methods and knowledge management capabilities of the 3DEXPERIENCE platform to manage all simulation data in one place. See how the solution enables users to capture a complex simulation workflow that integrates native 3DEXPERIENCE apps and external simulation tools to build a custom simulation process that gets deployed throughout the organization as a Simulation Experience. This makes it an accessible, repeatable, and reusable simulation process that democratizes best practices, ensures data traceability, and increases certification confidence with the ability to understand the pedigree of the simulation data used in the workflow.

Intel

Generational Performance of Intel Scalable Processors on Abaqus Standard & Explicit

Michael Riera, Optimization Engineer

The purpose of this talk is to discuss the performance improvement of public Abaqus benchmarks on the new generation scalable processor provided by Intel. We will discuss improved hardware, and software capabilities, as well as new technology to improve performance.

Synopsys

Moving Beyond CAD - 3D Image-Based Simulation of Real-World Geometries

Kerim Genc, Business Development Manager

This presentation will discuss how Synopsys Simpleware software is being used to reconstruct 3D image data (such as MRI and CT) and generate high-quality meshes for Finite Element (FE) packages such as SIMULIA Abaqus. In this talk, we will provide a concise overview of the various stages to producing image-based models, as well as recent developments in automated image segmentation using machine-learning. Additional details will also be given of industry-specific applications and case studies where Simpleware software and Abaqus have been implemented to solve real-world challenges.

S-Vertical

Integrated Simulation and Optimization of Composite Overwrapped Pressure Vessel (COPV) used for H2 storage for Energy, Aerospace and Transportation Industry

Amine Abichou, Technical Director

Filament winding is an automated fabrication process for producing composite structures where fibers are wound onto a rotating mandrel. This technique become a leading technology in producing high pressure composite vessels. Today, filament winding engineering requires to face upcoming challenges of high cost / high value applications like for instance mass-production for hydrogen passenger vehicles or weight optimization for space ships propulsion systems. In this presentation, we suggest an integrated approach to design, simulate and optimize a pressure vessel using Abaqus/FEA and WoundSim software, a new generation tool to design and simulate composite overwrapped pressure vessels.

TotalCAE

Using the Latest HPC Technology to Accelerate Abaqus

Rod Mach, President

This talk will showcase the latest HPC solutions that help accelerate Abaqus workloads, including case studies from various industries. If you are interested in how to reduce the runtime of your Abaqus simulations, this talk will give you a background on the technologies available when you outgrow a workstation.

Wolf Star Technologies

Load Measurement and Linear Dynamics with Wolf Star Technologies w/ a Pogo Stick Digital Twin Application

Tim G. Hunter, President

Understanding and interpreting loads and linear dynamics results are challenges in most engineering problems. Wolf Star Technologies will show theoretical background, examples and demonstration of their integrated solutions for understanding loads and interpreting linear dynamic solutions. True-Load™ is the tool provided by Wolf Star Technologies that turns components into their own load transducers. True-LDE™ is the post processing solution for *MODAL DYNAMIC, *STEADY STATE DYNAMICS and *RANDOM RESPONSE solves

which makes post processing interactive and natural while reducing solution time and storage requirements by up to 90%. All of the Wolf Star Technologies solutions have Abaqus/CAE plug-ins and have direct interface to fe-safe®. Wolf Star products can leverage an FEA solution in addition to Abaqus. We will be highlighting a handoff between two commercially available, off-the-shelf solutions (True-Load and Endurica) to create a closed-loop pogo stick digital twin that tracks damage accumulation due to actual loads experienced.

VIRTUAL INTEGRATED ANALYTICS SOLUTIONS

VIAS Virtual Booth – 3DMODSIM Conference, November 17-18, 2020

Syed M. Jafri, PhD, PE (Senior Simulation Consultant) & Arindam Chakraborty, PhD, PE (CTO)

Virtual Integrated Analytics Solutions (VIAS) is a technology driven services and software solution company with headquarters in the US and a presence in CANADA, MEXICO, and INDIA. We are a Value Added Reseller (VAR) of Dassault Systèmes (DS) and have the honor and distinction to be a Platinum Partner. VIAS' team consists of 60+ employees with many advanced degrees holders (PhD, Masters) in Design, Manufacturing, Structural Mechanics, Fluid Mechanics, Electromagnetics, Data Analytics, and Optimization & Reliability.

VIAS helps their customers with the following:

1. Providing sales and support for DS solutions such as 3DEXPERIENCE, SIMULIA, BIOVIA, CATIA, DELMIA, and ENOVIA.
2. Providing training for DS software solutions such as Abaqus, Isight, Tosca, Fe-Safe, CATIA. We also provide industry based and customized trainings in areas such as fitness-for-service (FFS), Offshore Engineering, Pipeline Analysis.
3. Providing physics-based engineering consultancy using FEA, CFD, EMAG for multiple industries such as Oil & Gas, Process & Petrochemicals, Life Science, Hi-Tech, Transportation & Mobility, Industrial Equipment, Consumer Packaged Goods.
4. Providing implementation, training and support for the 3DEXPERIENCE platform, which enables collaboration of design teams from conceptual CAD design to FEA and CFD in a seamless manner.

VIAS has successfully executed diverse projects involving simulation, design and optimization, scripting and automation. Many of these problems are highly complex and nonlinear in nature. Our software solution suite, strong industry practice and research experience and deep understanding of the software solutions makes us our client's top choice for a one stop shop provider.

We welcome you to visit our virtual booth and have an engaging conversation with our team to discover how we can help you with scientific simulation and technology driven software solutions.