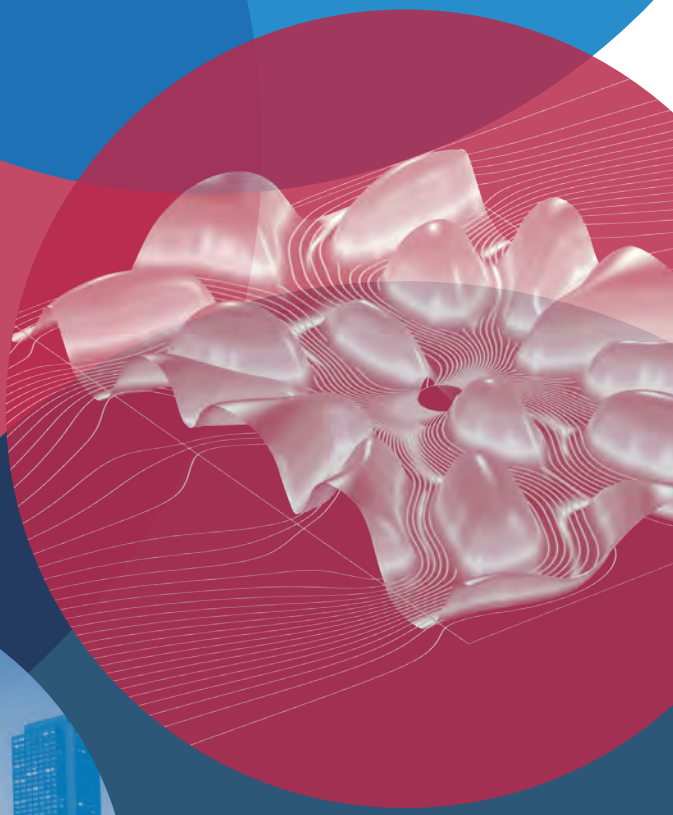
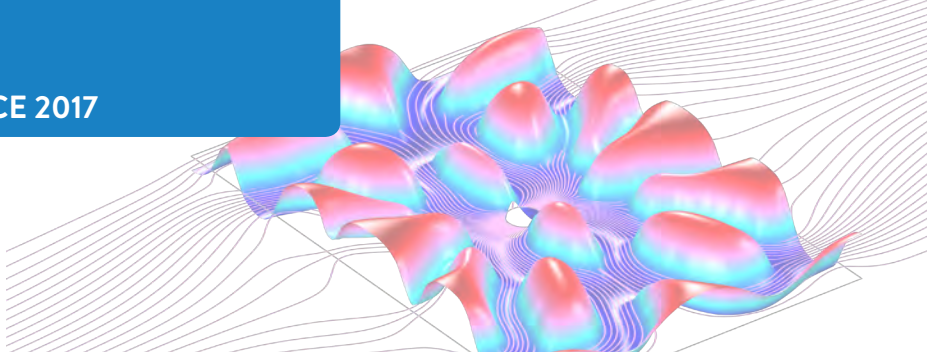
COMSOL CONFERENCE
2017 BOSTON

Invitation



COMSOL

WELCOME TO THE COMSOL CONFERENCE 2017



Join us October 4–6 at the Boston Marriott Newton. Over the course of 3 days, expand your skills in numerical simulation. Through a better understanding of multiphysics modeling and simulation applications, you'll be better equipped and inspired to tackle your next design challenge.

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Learn more about the COMSOL Conference and register today!

▶ comsol.com/conference/registration/boston

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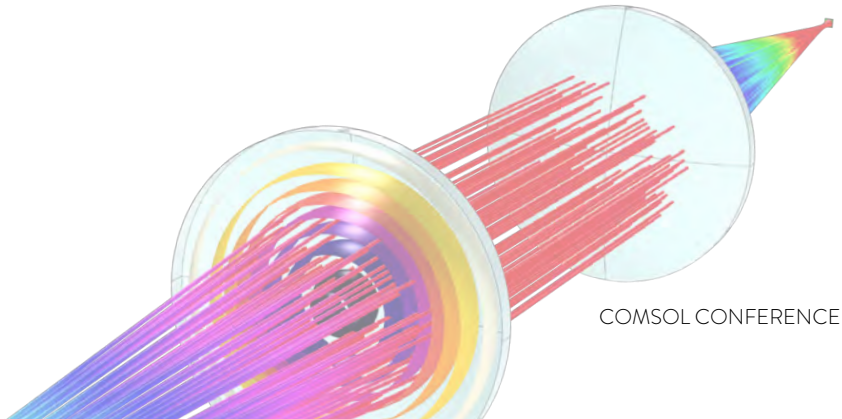
WEDNESDAY **OCTOBER 4**

TIME	EVENT
8:00AM	Registration Opens
9:00AM	**Minicourses** Chemical Reaction Engineering: Chemical Reactions Equation-Based Modeling Geometry Modeling and CAD Import Heat Transfer: Conduction and Convection Hands-on: Electromagnetics
10:30AM	Coffee Break
11:00AM	**Keynote** Svante Littmarck, COMSOL, Inc.
12:00PM	Lunch
1:00PM	**Demo Stations, Poster Session, Exhibition Open**
1:30PM	**Minicourses** Chemical Reaction Engineering: Battery Modeling Deploying Apps Using COMSOL Server™ LiveLink™ *for MATLAB®* Solvers: Understanding the Stationary Solvers Structural Mechanics: Statics and Dynamics Hands-on: Heat Transfer Sponsored Workshop: Simpleware - from 3D Image to Mesh *By: Synopsys*
3:00PM	Coffee Break
3:30PM	**Minicourses** Electromagnetics: Resistive and Capacitive Devices, and Particle Tracing Introduction to the Application Builder Solvers: Understanding the Time-Dependent Solvers Structural Mechanics: Nonlinearity and Fatigue Hands-on: CFD Sponsored Workshop: Modeling of Rubbers and Thermoplastics using the PolyUMod Library *By: Veryst Engineering*
5:00PM	**NASA Tech Briefs Cocktail Reception**
6:15PM	**Explore Boston**

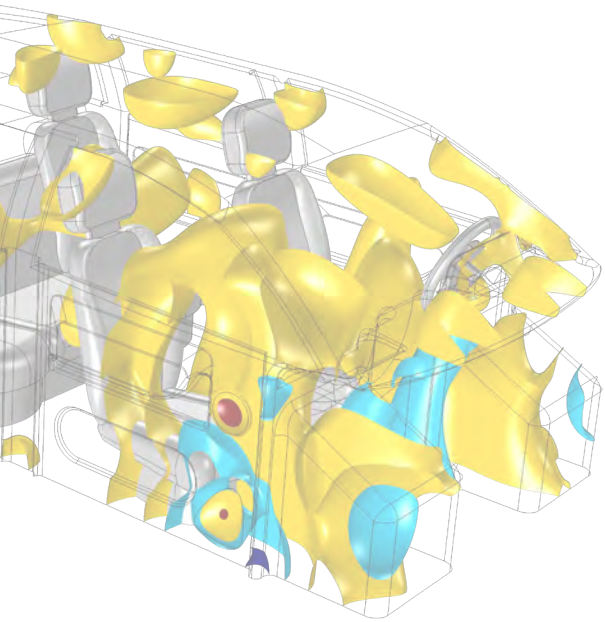
THURSDAY **OCTOBER 5**

TIME	EVENT
8:00AM	Registration and Breakfast
8:30AM	**Minicourses** CFD: Laminar and Microfluidic Flow, and Particle Tracing Electromagnetics: Magnets, Coils, and Motors Heat Transfer: Radiation and Environmental Modeling Meshing Hands-on: Structural Mechanics Sponsored Workshop: Accelerate Your COMSOL Multiphysics® Simulation Through Cloud HP *By: Rescale*
10:00AM	Coffee Break
10:30AM	**Keynote Session** Vasudevan Venkateshwaran, W. L. Gore and Associates Richard Little, Sonos Inc. Pablo Rolandi, Amgen
12:00PM	Lunch
1:00PM	**User Presentations**
2:30PM	Coffee Break
2:45PM	**User Presentations**
4:15PM	Coffee Break
4:30PM	**Minicourses** Acoustics and Vibrations Automating Model Building Using the Application Builder CFD: Turbulent and High Mach Number Flow, and Particle Tracing Optimization Hands on: Chemical Engineering Sponsored Workshop: Best Practices in Multiphysics *By: AltaSim*
6:00PM	**Poster Session**
7:00PM	Gala Dinner



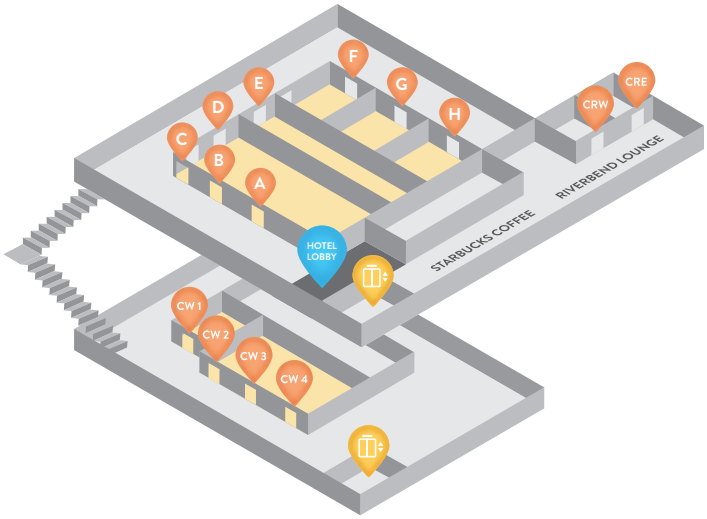
FRIDAY **OCTOBER 6**

TIME	EVENT
8:00AM	Registration and Breakfast
9:00AM	**Minicourses** Electromagnetics: Wave Electromagnetics, from RF to Optical Fluid-Solid Interactions Heat Transfer: Moisture Transport and Heat Transfer with Phase Change Postprocessing Hands-on: Core Functionality Sponsored Workshop: Introduction to HPC Private and Public Coud Computing wih COMSOL® *By: TotalCAE*
10:30AM	Coffee Break
11:00AM	**Keynote Session and Awards** Andrew Prudil, Canadian Nuclear Labs Stuart Brown, Veryst Engineering
12:00PM	Lunch
1:30PM	**Exhibition Closes**
1:30PM	**Minicourses** Introduction to the Application Builder Porous Media Flow Ray Optics Solvers: Understanding Solvers and Hardware Hands-on: Acoustics Sponsored Workshop: Chemical Engineering and Reaction Kinetics *By: M4Dynamics*
3:00PM	**Conference Ends**



FLOOR PLAN

CRE Charles River East
CRW Charles River West
CW Commonwealth



COMMUNITY EVENTS

EXPLORE BOSTON
Wednesday, 6:15PM - 10:30PM
Cambridge

Enjoy a tour of Harvard University

NASA TECH BRIEFS COCKTAIL RECEPTION
Wednesday, 5:00PM - 6:00PM
Salon A-D

Meet and greet fellow COMSOL® Software users.

EXHIBITION
Wednesday, 1:00PM - Friday 1:30PM
Salon A-D

Learn about exhibitors' products and services.

POSTER SESSION
Thursday, 6:00PM - 7:00PM
Salon A-D

View the posters and meet the authors.

LUNCH
Wednesday, 12:00PM - 1:00PM
Thursday, 12:00PM - 1:00PM
Friday, 12:00PM - 1:30PM
Riverside Lawn

Enjoy lunch while overlooking the Charles River with beautiful fall foliage.

GALA DINNER
Thursday, 7:00PM - 8:30PM
Salon E-H

Taste everything at this dinner buffet with relaxing atmosphere.

AWARDS CEREMONY
Friday, 11:00AM
Salon E-H

Celebrate the winners of the Best Poster and Best Paper awards.

COMSOL KEYNOTE

SVANTE LITTMARCK

PRESIDENT AND CEO, COMSOL, INC.

Wednesday, October 4

Svante Littmarck is the President and CEO of COMSOL, Inc. He cofounded the COMSOL group in 1986. In 2004, Littmarck received an honorary doctoral degree from the Royal Institute of Technology for the development and international reach of high quality software for scientific computations through his company COMSOL.

ACCELERATING DEVELOPMENT USING COMSOL SERVER™

VASUDEVAN VENKATESHWARAN

W. L. GORE AND ASSOCIATES

Thursday, October 5

The theory, modeling, and simulation teams at Gore develop many mathematical models and simulation tools that play a very important role in guiding new technology development. A major challenge that we face is deploying these tools for broader use across the enterprise, including our research centers in Europe and Asia. In this talk, I will discuss how we address this problem using the COMSOL Server™ product and our experience in using it over the last year. I will also discuss what advantages and limitations we have seen during our use and potential new capabilities that would enhance user experience.

BEYOND MODELING AND SIMULATION IN THE BIOPHARMA INDUSTRY

PABLO ROLANDI

AMGEN

Thursday, October 5

The Digital Integration and Predictive Technologies (DIPT) team at Amgen is tasked with transforming the way that Amgen does process development through the development, application, and deployment of mechanistic models and other digital/predictive technologies. These efforts span the life cycle of molecules and products (from prepivotal to commercial stages) across all functions within process development and beyond (including drug substances/ products and devices as well as engineering and manufacturing). In order to achieve this goal, DIPT develops models based on a multiphysics paradigm and implements/deploys a subset of these models in the COMSOL® software. In this talk, we will describe a half a dozen applications involving various transport phenomena; chemical reactions; and other physicochemical processes, including chromatography separations and device sterilizations, among others. The examples will go beyond conventional simulations and parameter sweeps and demonstrate the use of mechanistic models in uncertainty/risk-based analyses. Model deployment considerations will be discussed, given Amgen's leading vision in this front.

DESIGNING DURABLE AUDIO TRANSDUCERS

RICHARD LITTLE

SONOS INC.

Thursday, October 5

Audio transducers are the devices in loudspeakers that convert electrical signals into outgoing pressure waves, allowing the consumer to enjoy music. Finite element analysis is commonly used to enable design optimization for such devices to hit their performance targets. A topic less often investigated in the industry is the one of durability: how to design devices such that they can withstand the rigors of operation, handling, and their environment. This presentation outlines some design practices involved with designing transducers for durability in a predictive manner and discusses some of the ongoing challenges in such efforts.

MODELING NUCLEAR FUEL: A STUDY IN MULTIPHYSICS

ANDREW PRUDIL

CANADIAN NUCLEAR LABS

Friday, October 6

Nuclear fuel experiences a complex environment of elevated temperatures, temperature gradients, mechanical loading, thermal expansion, swelling, densification, radiation, and continuously evolving composition and microstructure. Understanding and predicting the coupled, aggregate behavior is crucial for optimizing the design and operation of the fuel. In this talk, I will present two COMSOL Multiphysics® models developed for modeling the continuum and microstructural aspects of nuclear fuel.

USING MULTIPHYSICS TO DIAGNOSE THE CAUSE OF A TOXIC LEAK

STUART BROWN

VERYST ENGINEERING

Friday, October 6

A safety critical valve failed during testing, exposing workers to a toxic fluid. One potential reason for the leak was thermal damage to the interior polymer gaskets and seals within the valve resulting from the valve's welding installation. Veryst Engineering used the COMSOL Multiphysics® software to simulate the welding process, tracking the evolving weld-induced temperature that could exceed the polymer gaskets' safe-use temperatures. Our analysis, described in this presentation and supported by testing, provided a thorough understanding of the problem and the most plausible explanation for the release.

COMSOL FUNDAMENTALS

INTRODUCTION TO THE APPLICATION BUILDER

Wednesday October 4, 3:30PM
Speaker: Kateryna Vyshenska

Friday October 5, 1:30PM
Speaker: Bjorn Sjodin

The Application Builder, included in the COMSOL Multiphysics® software, allows you to wrap your COMSOL models in user-friendly interfaces. This minicourse will cover the two main components of the Application Builder: the Form Editor and the Method Editor. You will learn how to use the Form Editor to add buttons, sliders, input and output objects, and more. You will also learn how to use the Method Editor and other tools to efficiently write methods to extend the functionality of your apps.

AUTOMATING MODEL BUILDING USING THE APPLICATION BUILDER

Thursday October 5, 4:30PM
Speaker: Temesgen Kindo

Learn how to use the Application Builder and the Method Editor to automate your model building, including setting up the geometry, material properties, loads and boundary conditions; meshing; solving; and extracting data. You will learn how the Application Builder can be a powerful tool in your modeling process.

DEPLOYING APPS USING COMSOL SERVER™

Wednesday October 4, 1:30PM
Speaker: Simon Clucas

Learn how to use COMSOL Server™ to deploy apps created with COMSOL Multiphysics® and spread the use of simulation. This minicourse will introduce you to working with the administration web page, managing user accounts and privileges, uploading and managing apps, monitoring usage, and configuring system-level settings.

SOLVERS: UNDERSTANDING THE STATIONARY SOLVERS

Wednesday October 4, 1:30PM
Speaker: Walter Frei

COMSOL Multiphysics® gives you precise control over the way in which your multiphysics models are solved. In this minicourse, we will cover the fundamental numerical techniques and underlying algorithms used for steady-state models, and explain the reasons behind the default solver settings. Building upon this knowledge, you will learn various techniques for achieving or accelerating convergence of nonlinear multiphysics models.

SOLVERS: UNDERSTANDING THE TIME-DEPENDENT SOLVERS

Wednesday October 4, 3:30PM
Speaker: Temesgen Kindo

COMSOL Multiphysics® includes a set of powerful implicit time-stepping algorithms for fast and accurate solutions to transient models. In this minicourse, you will learn how to pick a solver based on the problem at hand, measure and control computational error, as well as check convergence and other salient issues in time-dependent analyses using the finite element method.

SOLVERS: UNDERSTANDING SOLVERS AND HARDWARE

Friday October 6, 1:30PM
Speaker: Walter Frei

Solving large and complex finite element models can take significant time and computational resources. In this minicourse, we will address the differences of the various solvers in the COMSOL Multiphysics® software in terms of their time and memory usage. Solver performance is also inextricably linked to computer architecture. We will address issues such as memory bandwidth, using parallel and cluster computing efficiently, and handling very large models.

EQUATION-BASED MODELING

Wednesday October 4, 9:00AM
Speaker: Temesgen Kindo

Partial differential equations (PDEs) constitute the mathematical foundation to describe the laws of nature. This minicourse will introduce you to the techniques for constructing your own linear or nonlinear PDE systems. You will also learn how to add ordinary differential equations (ODEs) and algebraic equations to your model.

OPTIMIZATION

Thursday October 5, 4:30PM
Speaker: Walter Frei

The Optimization Module will take you beyond traditional engineering analysis and into the design process. In this minicourse, you will learn to use gradient-based optimization techniques and constraint equations to define and solve problems in shape, parameter, and topology optimization, as well as inverse modeling. The techniques shown in this minicourse are applicable for almost all types of models.

POSTPROCESSING

Friday October 6, 9:00AM
Speaker: Angela Straccia

When presenting your results, the quality of your postprocessing will determine the impact of your presentation. This minicourse will thoroughly explore the many tools in the Results node designed to make your data look its best. These include mirroring, revolving symmetric data, cut planes, cut lines, exporting data, joining or comparing multiple data sets, as well as animations. You look best when your data looks best!

MESHING

Thursday October 5, 8:30AM
Speaker: Lorant Olasz

In this minicourse, we will walk you through the meshing techniques that are available to you in the COMSOL Multiphysics® software. We will introduce you to basic meshing concepts, such as how to tweak the meshing parameters for unstructured meshes. More advanced topics include working with swept meshes and creating mesh plots. You will also learn a useful technique for meshing imported CAD designs: how to hide small geometry features from the mesher.

GEOMETRY MODELING AND CAD IMPORT

Wednesday October 4, 9:00AM
Speaker: Lorant Olasz

Whether you choose to construct a geometry in the COMSOL Desktop® or to import it from a CAD file, this minicourse will demonstrate some useful tools. Did you know that COMSOL Multiphysics® can automatically generate the cross section of a solid object and that you can use it for a 2D simulation? Or that you can directly import topographic data to create 3D objects? Generating a geometry is also about preparing selections for physics settings. By using the right selection tools, you can easily automate the modeling workflow even when this involves simulations on widely different versions of a geometry. Attend this minicourse to see a demonstration of these techniques and more.

HANDS-ON: CORE FUNCTIONALITY

Friday October 6, 9:00AM
Speaker: Kateryna Vyshenska

This guided hands-on session will walk you through examples relying on the core functionality of COMSOL Multiphysics and will complement the material covered during the Meshing, Solvers, and Optimization minicourses.

ELECTROMAGNETICS

ELECTROMAGNETICS: RESISTIVE AND CAPACITIVE DEVICES, AND PARTICLE TRACING

Wednesday October 4, 3:30PM
Speaker: Durk de Vries

In this minicourse, we will address the modeling of resistive and capacitive devices with the AC/DC Module and discuss the calculation of ion and electron trajectories using the Particle Tracing Module. We will also cover the calculation of electric fields under steady-state, transient, and frequency-domain conditions, as well as the extraction of lumped parameters such as capacitance matrices. Applications include modeling of resistive heating and sensor design. Additionally, we will discuss the Charged Particle Tracing interface, with applications in mass spectrometry, accelerator physics, ion optics, and etching.

ELECTROMAGNETICS: MAGNETS, COILS, AND MOTORS

Thursday October 5, 8:30AM
Speaker: Durk de Vries

Magnetic fields arise due to magnets and the flow of current. In this minicourse, you will learn about using the AC/DC Module to model static, transient, and frequency-domain magnetic fields that arise around magnets and coils. We will introduce various ways of modeling magnetically permeable materials as well as address motor and generator modeling.

ELECTROMAGNETICS: WAVE ELECTROMAGNETICS, FROM RF TO OPTICAL

Friday October 6, 9:00AM
Speaker: Durk de Vries

In this minicourse, we will cover the use of the RF Module and Wave Optics Module for simulating Maxwell's equations in the high-frequency, electromagnetic wave regime. We will discuss applications in resonant cavity analysis, antenna modeling, transmission lines and waveguides, periodic structures, and scattering. Then, we will address the coupling of electromagnetic wave simulations to heat transfer, such as in RF heating, for example.

RAY OPTICS

Friday October 6, 1:30PM
Speaker: Christopher Boucher

In this minicourse, we will cover the use of the Ray Optics Module to simulate electromagnetic wave propagation in optically large geometries in which the wavelength is much smaller than the smallest geometric detail in the model. You will learn how to trace rays through homogeneous and graded-index media, model reflection and refraction at mirrors and lenses, analyze ray intensity and polarization, and investigate various optical aberrations. We will discuss application areas including cameras, spectrometers, laser focusing systems, and solar collectors. You will also learn how to apply the Ray Optics Module in a multiphysics context by considering structural and thermal effects.

HANDS-ON: ELECTROMAGNETICS

Wednesday October 4, 9:00AM
Speaker: Kiran Uppalapati

This guided hands-on session will walk you through examples from electromagnetics and will complement the material covered during the Electromagnetics minicourses.

STRUCTURAL AND ACOUSTICS

STRUCTURAL MECHANICS: STATICS AND DYNAMICS

Wednesday October 4, 1:30PM
Speaker: Henrik Sönnerlind

In this minicourse, we will address the modeling of stresses, strains, and deflections in solid materials and mechanisms. Stationary, transient, and frequency-domain simulations will be covered. Shells, membranes, beams, and trusses will also be introduced. If you are interested in learning about the Structural Mechanics Module and Multibody Dynamics Module, this minicourse is for you.

STRUCTURAL MECHANICS: NONLINEARITY AND FATIGUE

Wednesday October 4, 3:30PM
Speaker: Henrik Sönnerlind

This minicourse builds upon static and dynamic modeling to address questions of material nonlinearity and fatigue. We will cover the various nonlinear material models used for modeling of metals, polymers, soils, and ceramics. Furthermore, we will discuss creep modeling and structural and thermal fatigue modeling.

ACOUSTICS AND VIBRATIONS

Thursday October 5, 4:30PM
Speaker: Mads Jensen

Acoustic pressure waves in fluids such as air or water interact with surrounding structures resulting in vibrations in solids and absorption in porous materials. Furthermore, in narrow structures, thermal and viscous loss in the fluid become significant and need to be included. In large domains, such as rooms or in the ocean, ray and diffusion methods need to be used. In this minicourse, we will use the Acoustics Module to demonstrate the simulation of these waves and their effects. You will also learn about recent news and additions to the COMSOL Multiphysics® software. Application areas include, but are not limited to: muffler design, mobile devices, transducer design, loudspeakers, sound insulation materials, room and car acoustics, and ultrasound flow meters.

HANDS-ON: STRUCTURAL MECHANICS

Thursday October 5, 8:30AM
Speaker: Kateryna Vyshenska

This guided hands-on session will walk you through examples from structural mechanics and will complement the material covered during the Structural Mechanics minicourses.

HANDS-ON: ACOUSTICS

Friday October 6, 1:30PM
Speaker: Jinlan Huang

This guided hands-on session will walk you through examples from acoustics and will complement the material covered during the Acoustics minicourse.

FLUID AND HEAT

CFD: LAMINAR AND MICROFLUIDIC FLOW, AND PARTICLE TRACING

Thursday October 5, 8:30AM
Speaker: Ed Fontes

In this minicourse, we will cover the Microfluidics Module, which features custom interfaces for the simulation of microfluidic devices and rarefied gas flows. Single-phase flow capabilities include both Newtonian and non-Newtonian flow. Beyond its single-phase flow capabilities, this module also allows for two-phase flow simulations capturing surface tension forces, capillary forces, and Marangoni effects. Typical applications include: lab-on-a-chip (LOC) devices, digital microfluidics, electrokinetic and magnetokinetic devices, inkjets, and vacuum systems. We will also discuss the Particle Tracing for Fluid Flow interface, with applications such as dielectrophoretic separation, filtration, erosion, and mixing of inertial particles in fluids.

CFD : TURBULENT AND HIGH MACH NUMBER FLOW, AND PARTICLE TRACING

Thursday October 5, 4:30PM
Speaker: Ed Fontes

Learn how to efficiently simulate incompressible and compressible turbulent flows in this CFD minicourse. The CFD Module allows for accurate multiphysics-flow simulations such as conjugate heat transfer with nonisothermal flow and fluid-structure interactions. We will also discuss the module interfaces for simulating flow in porous media, discrete and homogeneous two-phase flow, and flow in stirred vessels with rotating parts.

HEAT TRANSFER: CONDUCTION AND CONVECTION

Wednesday October 4, 9:00AM
Speaker: Nicolas Huc

In this minicourse, you will learn about modeling conductive and convective heat transfer with COMSOL Multiphysics®, the Heat Transfer Module, CFD Module, and Subsurface Flow Module. Conductive heat transfer modeling addresses heat transfer through solids and can include heat transfer in thin layers, contact thermal resistance, and phase change. Convective heat transfer addresses heat transfer in solids and fluids. We will address natural convection induced by buoyancy forces.

HEAT TRANSFER : RADIATION AND ENVIRONMENTAL MODELING

Thursday October 5, 8:30AM
Speaker: Nicolas Huc

Radiative heat transfer is one of the three types of heat transfer and plays a major role in many applications. During this session, we will focus on the features to model surface-to-surface radiation for gray surfaces or for multiple spectral bands, such as for solar and infrared radiation, for example. We will discuss different examples in order to help identify cases where thermal radiation has to be accounted for.

Defining ambient conditions is a key point in the model definition, especially when solar radiation is accounted for, but there are also other cases. We will review the different means to define the ambient condition and how use them for conduction, convection, and radiation in the heat transfer models.

HEAT TRANSFER: MOISTURE TRANSPORT AND HEAT TRANSFER WITH PHASE CHANGE

Friday October 6, 9:00AM
Speaker: Nicolas Huc

Changes in the temperature of a material can lead to a change in material phase, from solid to liquid to gas. Evaporation and condensation of water is a very common case of phase change. This minicourse will introduce you to moisture transport and the various types of phase change modeling that can be done with COMSOL Multiphysics® and the Heat Transfer Module. We will address the relative merits and trade-offs between these techniques.

FLUID-SOLID INTERACTIONS

Friday October 6, 9:00AM
Speaker: Chandan Kumar

COMSOL Multiphysics® can perform truly bidirectional fluid-structure interactions where viscous and pressure forces act on an elastic structure and structural velocity forces act back on the fluid. Attend this minicourse to learn about the ready-made physics interface that is available for this important multiphysics application.

POROUS MEDIA FLOW

Friday October 6, 1:30PM
Speaker: Angela Straccia

Porous media surrounds us; be it the ground beneath us, paper products, filters, or even biological tissue. In this minicourse, we will explore flow and diffusion in porous media as well as how to treat partially saturated media. We will also cover coupled systems including linked free and porous flows; poroelasticity; and mass convection-diffusion in forced, gravity-fed, and density-driven flows.

HANDS-ON: CFD

Wednesday October 4, 3:30PM
Speaker: Siva Sashank Tholeti

This guided hands-on session will walk you through examples from fluid flow and will complement the material covered during the CFD minicourses.

HANDS-ON: HEAT TRANSFER

Wednesday October 4, 1:30PM
Speaker: Siva Sashank Tholeti

This guided hands-on session will walk you through examples from heat transfer and will complement the material covered during the Heat Transfer minicourses.

CHEMICAL

CHEMICAL REACTION ENGINEERING: CHEMICAL REACTIONS

Wednesday October 4, 9:00AM
Speaker: Ed Fontes

In this minicourse, you will learn to build system-level reaction kinetics models together with process models that include effects of mass, momentum, and energy transport using the Chemical Reaction Engineering Module. This course will also address topics including surface reactions, diffusion and convection in diluted and concentrated solutions, thermal effects on reaction chemistry, mass and heat transfer in heterogeneous catalysis, and optimization of yield and throughout.

CHEMICAL REACTION ENGINEERING: BATTERY MODELING

Wednesday October 4, 1:30PM
Speaker: Henrik Ekström

In this minicourse, you will learn to model battery cells with a focus on lithium-ion batteries, including charge transport and electrode reactions, and get an introduction to the corresponding couplings to heat transport for performing thermal simulations. We will address how to simulate various transient phenomena such as constant current-constant voltage (CCCV) charge/discharge cycling, electrochemical impedance spectroscopy (EIS), and capacity fade.

HANDS-ON: CHEMICAL ENGINEERING

Thursday October 5, 4:30PM
Speaker: Siva Sashank Tholeti

This guided hands-on session will walk you through examples from chemical engineering and will complement the material covered during the Chemical Engineering minicourses.

INTERFACING

LIVELINK™ for MATLAB®

Wednesday October 4, 1:30PM
Speaker: Jesper Been

This minicourse will focus on how to interface the MATLAB® and COMSOL Multiphysics® software. Learn how to use MATLAB® as a scripting interface to implement and solve your COMSOL Multiphysics® simulation, export or import your data at the MATLAB® command prompt, and define model properties such as boundary conditions or material definitions within an m-function.

SPONSORED WORKSHOPS

SIMPLEWARE - FROM 3D IMAGE TO MESH

Wednesday October 4, 1:30PM
By: Synopsys

This minicourse demonstrates the ease of obtaining high-quality meshes from 3D images for use in the COMSOL Multiphysics® software. The workflow of processing volume image data (e.g., from MRI, CT, Micro-CT, and FIB-SEM) to create meshes for life sciences, materials, and industrial applications will be outlined and demonstrated. Learn how the robust and automated meshing algorithms can convert multiple segmented regions into multipart, watertight and analysis-ready models in minutes. Also, see the latest image visualization, segmentation, and meshing tools from recent and upcoming releases.

MODELING OF RUBBERS AND THERMOPLASTICS USING THE POLYUMOD LIBRARY

Wednesday October 4, 3:30PM
By: Veryst Engineering

The nonlinear, strain-rate, and temperature-dependent response of polymers can be accurately captured using the COMSOL Multiphysics® software through the External Material Model interface and the PolyUMod® library. In this workshop, we will demonstrate how the PolyUMod® library can be used to accurately predict the thermomechanical response of different materials. The examples will include all steps from experimental testing to material model calibration to COMSOL simulations.

ACCELERATE YOUR COMSOL MULTIPHYSICS® SIMULATION THROUGH CLOUD HPC

Thursday October 5, 8:30AM
By: Rescale

In this workshop, we will show you how to run COMSOL Multiphysics® simulations faster on Rescale through a live demo. Learn how to accelerate your COMSOL Multiphysics® workflows and leverage the Rescale cloud computing platform. You can instantly scale out your COMSOL Multiphysics® simulation with the best possible hardware. Through concrete engineering use cases and benchmark results, attendees also learn best practices on how to cost-effectively tap into the power of cloud computing. All attendees of the workshop will receive free Rescale hardware credit to try it yourself.

BEST PRACTICES IN MULTIPHYSICS

Thursday October 5, 4:30PM
By: AltaSim Technologies

In this course, AltaSim will draw on our extensive experience in multiphysics modeling to provide guidance for analyzing multiphysics problems in COMSOL Multiphysics®. The material focuses on providing lessons learned and tips for obtaining solutions to complex problems. Overall strategies are combined with tactical guidance to teach COMSOL Multiphysics® users how to work through the setup of their problems. This course includes information on different solution approaches from our Solver Settings for Effective Analysis in COMSOL Multiphysics® course.

INTRODUCTION TO HPC PRIVATE AND PUBLIC CLOUD COMPUTING WITH COMSOL®

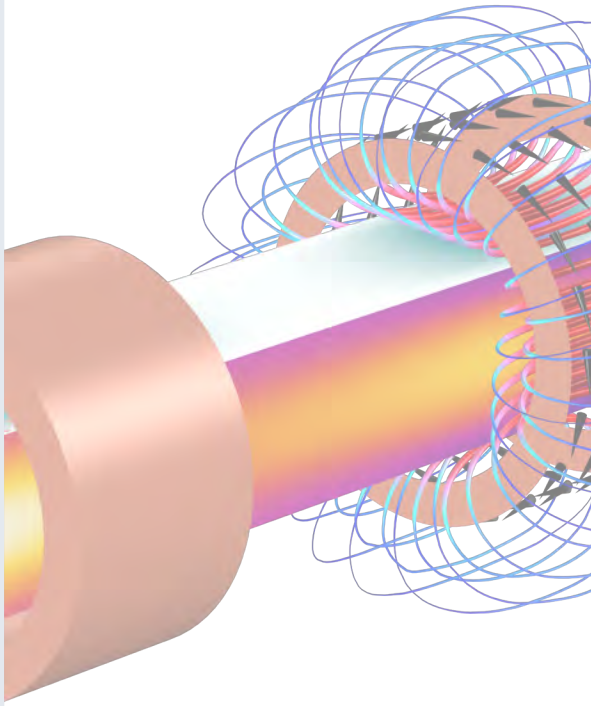
Friday October 6, 9:00AM
By: TotalCAE

Learn how companies are adopting the latest trends in high-performance private and public cloud computing to accelerate COMSOL Multiphysics® simulation. Several customer case studies will be presented to show real-world solutions.

CHEMICAL ENGINEERING AND REACTION KINETICS

Friday October 6, 1:30PM
By: M4Dynamics

In this workshop, we will explore in depth the use of equilibrium thermodynamics on the multiphysics simulation of chemical engineering and reaction kinetics problems by using the external function library M4Dlib™ and the M4D-ChemApp™ interface for the COMSOL® software. We will see how to import thermodynamic properties and functions of multicomponent systems to establish the relation between forward and reverse rate constants in reaction kinetics problems and see how the thermodynamic properties of the components affect the result as a function of temperature. In this workshop, we will also work on solving a solidification problem in which multicomponent nonideal solutions are involved. Finally, a mechano-chemical problem involving hydrogel swelling phenomena will be solved using a thermodynamic approach, linking the thermodynamic model to the Structural Mechanics Module. All the attendants to the workshop will receive a two-week free trial for M4Dlib™.



INFORMATION TO COME

EXHIBITION

See what is being offered from the many exhibitors during the event. COMSOL Certified Consultants, software and hardware providers and others are there to showcase their services to help you improve and speed up your design work.

Growing List of Exhibitors

AltaSim Technologies
Veryst Engineering
Synopsys
Rescale
TotalCAE
M4 Dynamics
Numerical Design Inc
Pryor Knowledge Systems
Mercury Learning
IEEE Spectrum
NASA Tech Bridges
Physics Today
Digital Engineering

USER PRESENTATIONS/POSTER SESSIONS AND PANEL DISCUSSIONS

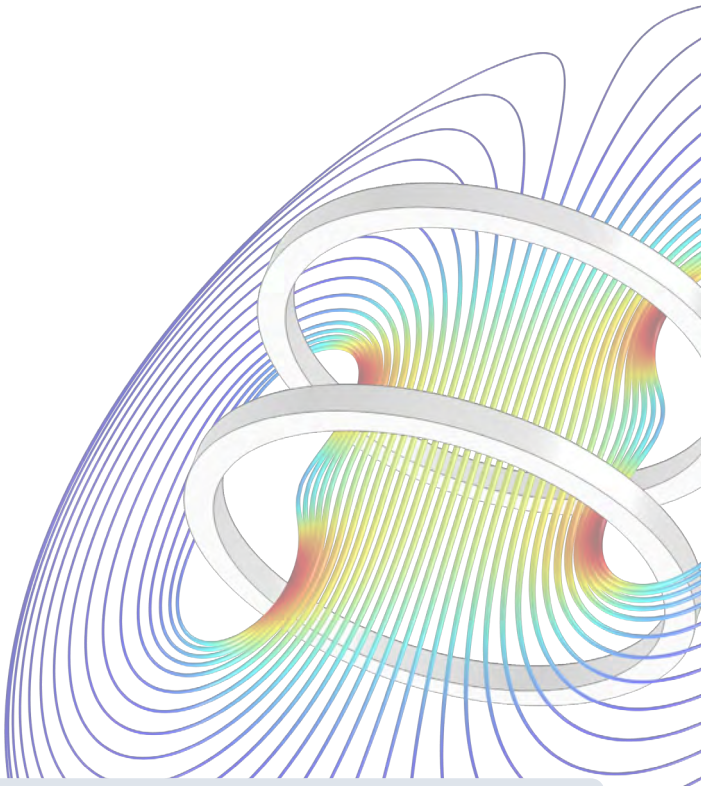
There are many ways engineers and researchers are using COMSOL. Check out over 200 individual presentations held throughout the Conference. Poster presentations will be on display in the exhibit hall starting at 1pm on Wednesday.

Special panel discussions will be held during our oral presentation sessions on Thursday afternoon. Listen as we engage in conversation with COMSOL users and developers in the areas of acoustics and medical applications.

DEMO STATIONS

This is your opportunity to receive technical support from a COMSOL application engineer face to face. Show them your work or ask questions to our knowledgeable team who will show you tips on how to use multiphysics simulation for your specific project. Visit them at our Demo Stations!

For more information on the COMSOL Conference 2017
visit:
comsol.com/conference/boston
or contact:
Frida.Nilsson@comsol.com
781-273-3322



"The COMSOL Conference offered a great chance to meet long-time users as well as developers of the software. The minicourses helped me understand how COMSOL Multiphysics® works and showed best practices that are useful for beginners and advanced users."

— Kedar Chitale
FloDesign Sonics

"This conference is absolutely essential for anyone using or planning to use COMSOL Multiphysics®. The minicourses and hands-on sessions gave me the option to learn from the experiences of other users."

— Atul Dhall
SUNY Polytechnic University

"It was my first time attending the COMSOL Conference. I found it extremely useful and a great learning and networking opportunity. I felt that I was treated like an important member of the fast-growing COMSOL community."

— Shahid Ahmed
University of Ontario Institute of Technology