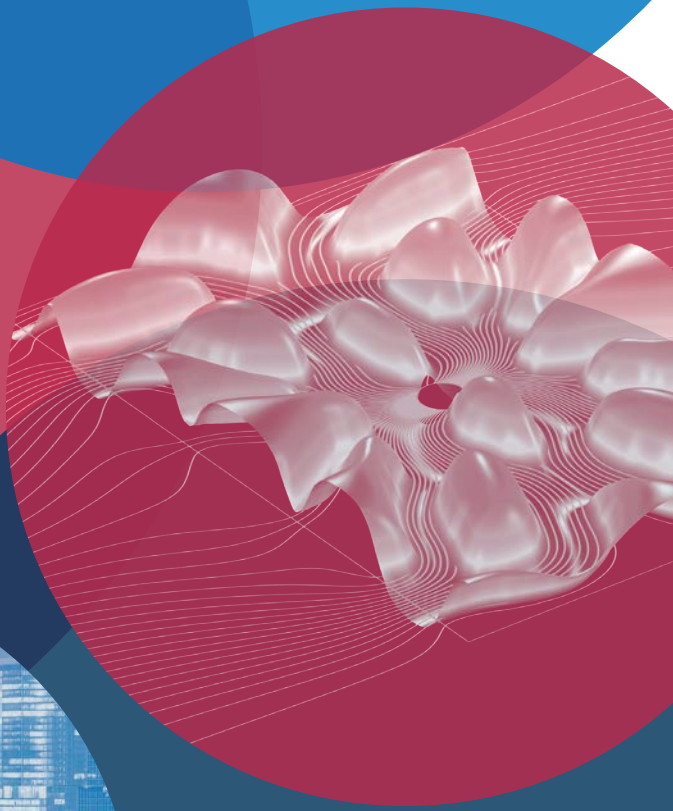
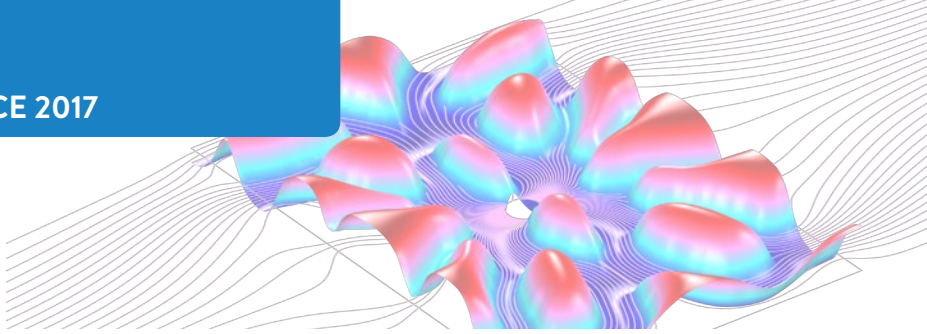
COMSOL CONFERENCE 2017 ROTTERDAM

Final Program



COMSOL

WELCOME TO THE COMSOL CONFERENCE 2017



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.

TABLE OF CONTENTS

Gold Sponsors

intel

SYNOPSYS®

Media Sponsors

BITS&CHIPS

IEEE SPECTRUM

TECH BRIEFS

CAD Magazine

KIVI

NewScientist

Design World

LaserFocusWorld

physics today

eos

MECHANICAL ENGINEERING

Physik Journal

scientific computing world

WEDNESDAY **OCTOBER 18**

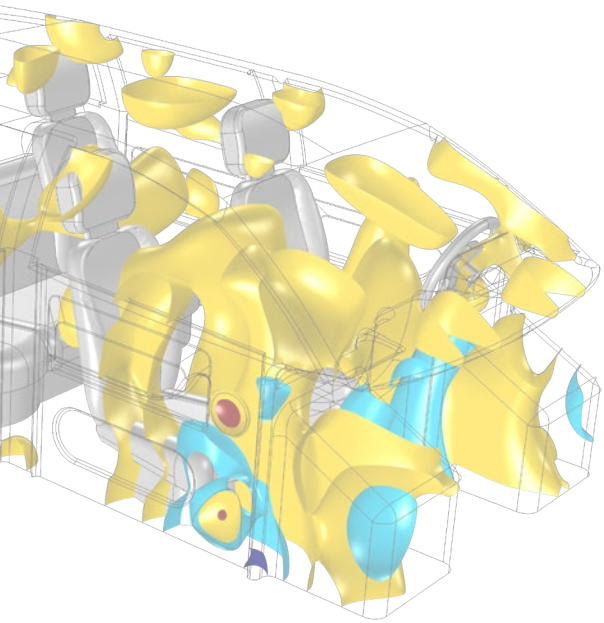
TIME	EVENT	ROOM
8:00AM	Registration Opens	Shipping Hall
9:00AM	**Minicourses**	
Chemical Reaction Engineering: Chemical Reactions		Leeuwen
Deploying Apps using COMSOL Server™		Goudriaan
Equation-Based Modeling		Diamond
Geometry Modeling and CAD Import		Mees Auditorium
Heat Transfer: Conduction and Convection		van Oldenbarnevelt
Hands-on: Electromagnetics		Penn
10:30AM	**Demo Stations, Poster Session, Exhibition Open**	Shipping Hall
10:30AM	Coffee Break	Shipping Hall
11:00AM	**Keynote**	**Rotterdam Hall**
Svante Littmarck, *COMSOL, Inc.*		
12:00PM	Lunch	Shipping Hall
1:00PM	**Minicourses**	
Chemical Reaction Engineering: Battery Modeling		Leeuwen
LiveLink™ *for MATLAB®*		Penn
Solvers: Part 1 Understanding the Stationary Solvers		van Oldenbarnevelt
Structural Mechanics: Statics and Dynamics		Diamond
Hands-on: Heat Transfer		Mees Auditorium
Sponsored Workshop: Simpleware - from 3D Image to Mesh By: Simpleware		Goudriaan
2:30PM	Coffee Break	Shipping Hall
3:00PM	**Minicourses**	
Electromagnetics: Resistive and Capacitive Devices, and Particle Tracing		Penn
Introduction to the Application Builder		van Oldenbarnevelt
Solvers: Part 2 Understanding the Time-Dependent Solvers		Leeuwen
Structural Mechanics: Nonlinearity and Fatigue		Diamond
Hands-on: CFD		Mees Auditorium
4:30PM	**Cocktail Reception**	Shipping Hall
7:30PM	**Boat Tour**	Leuvenhoofd

THURSDAY **OCTOBER 19**

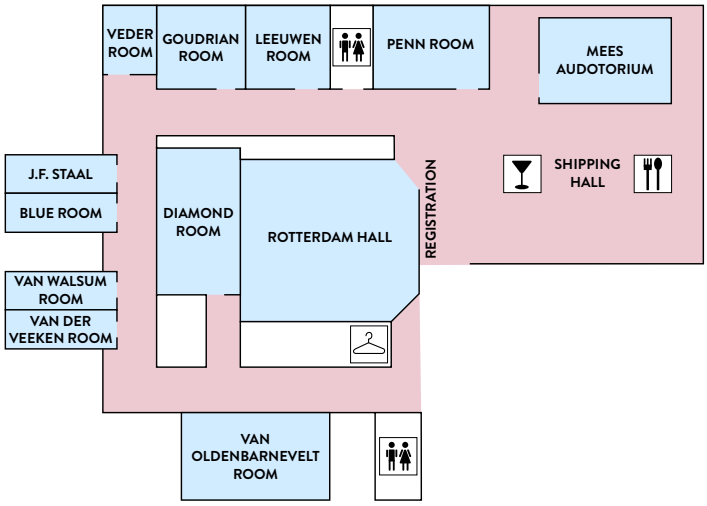
TIME	EVENT	ROOM
8:00AM	Registration	Shipping Hall
8:30AM	**Minicourses**	
CFD: Laminar and Microfluidic Flow, and Particle Tracing		van Oldenbarnevelt
Electromagnetics: Magnets, Coils, and Motors		Mees Auditorium
Heat Transfer: Radiation and Environmental Modeling		Penn
Meshing		Diamond
Hands-on: Structural Mechanics		Leeuwen
10:00AM	Coffee Break	Shipping Hall
10:30AM	**Keynote Session**	**Rotterdam Hall**
Patrik Kennes, *Cochlear Technology Centre*		
Mathieu Pobeda, *Nexo*		
Stephen Gillich, *Intel*		
12:00PM	Lunch	Shipping Hall
1:00PM	**User Presentations**	
Acoustics and Vibrations 1		Penn
Batteries, Fuel Cells, and Electrochemical Processes		Van Walsum
Bioscience and Bioengineering		Leeuwen
Chemical Reaction Engineering		Goudriaan Room
Electromagnetics 1		Diamond
Geophysics and Geomechanics		J.F. Staal
Heat Transfer and Phase Change		Van Oldenbarnevelt
Heat Transfer 1		Mees Auditorium
Structural Mechanics and Thermal Stresses		Blue
Panel Discussion: Heat Transfer Modeling and Simulation		Van der Veeken
2:30PM	Coffee Break	Shipping Hall
2:45PM	**User Presentations**	
Acoustics and Vibrations 2		Penn
CFD		Mees Auditorium
Chemical Engineering and Microfluidics		Goudriaan
COMSOL Applications and Simulation Methods		Van der Veeken
Electromagnetics 2		Diamond
Heat Transfer 2		Van Oldenbarnevelt
Optics, Photonics, RF and Microwave Engineering		Van Walsum
Particle Tracing in Electromagnetic Fields		Blue
Plasma Physics		J.F. Staal
Panel Discussion: Acoustics Modeling and Simulation		Leeuwen Room
4:15PM	Coffee Break	Shipping Hall
4:30PM	**Minicourses**	
Acoustics and Vibrations		Mees
Automating Model Building Using the Application Builder		Penn
CFD: Turbulent and High Mach Number Flow, and Particle Tracing		van Oldenbarnevelt
Optimization		Diamond
Hands on: Chemical Engineering		Leeuwen
6:00PM	**Poster Session**	Shipping Hall
7:00PM	Gala Dinner	Rotterdam Hall

FRIDAY **OCTOBER 20**

TIME	EVENT	ROOM
8:30AM	Registration	Shipping Hall
9:00AM	**Minicourses**	
Electromagnetics: Wave Electromagnetics, from RF to Optical		Penn
Fluid-Solid Interactions		Mees
Heat Transfer: Heat Transfer with Phase Change		van Oldenbarnevelt
Postprocessing		Diamond
Hands-on: Core Functionality		Leeuwen
10:30AM	Coffee Break	Shipping Hall
11:00AM	**Keynote Session**	**Diamond**
Arie de Niet, *Witteveen+Bos*		
Lucia Zullino & Lucrezia Guarino, *STMicroelectronics*		
12:00PM	Lunch	Shipping Hall
1:00PM	**Exhibition Closes**	
1:00PM	**Minicourses**	
Introduction to the Application Builder		Penn
Porous Media Flow		van Oldenbarnevelt
Ray Optics		Mees
Solvers: Part 3, Understanding Solvers and Hardware		Diamond
Hands-on: Acoustics		Leeuwen
2:30PM	**Conference Ends**	



FLOOR PLAN



COMMUNITY EVENTS

BOAT TOUR
Wednesday, 7:30PM
Leuvenhoofd

Join us for a boat tour of the different harbors in Rotterdam and enjoy a view of the city skyline.

COCKTAIL RECEPTION
Wednesday, 4:30PM

Meet and greet fellow COMSOL® Software users.

EXHIBITION
Wednesday, 10:30AM - Friday 1:00PM

Learn about exhibitors' products and services.

POSTER SESSION
Thursday, 6:00PM - 7:00PM

View the posters and meet the authors.

LUNCH
Wednesday, 12:00PM - 1:00PM
Thursday, 12:00PM - 1:00PM
Friday, 12:00PM - 1:00PM

GALA DINNER
Thursday, 7:00PM - 8:30PM

Taste everything at this dinner buffet with relaxing atmosphere.

COMSOL KEYNOTE

SVANTE LITTMARCK

PRESIDENT AND CEO, COMSOL, INC.

Wednesday, October 18

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.

SCALING SIMULATION: COMPUTE, ACCESSIBILITY, AND USE OF EMERGING TECHNOLOGIES

STEPHAN GILLICH

DIRECTOR TECHNICAL COMPUTING AND AI GTM EMEA, INTEL DEUTSCHLAND GMBH

Thursday, October 19

We can look back to over two decades of computer driven simulation usage in engineering. An increase in compute performance, functionality and accessibility of the solutions allows the benefits of simulation to be scaled higher and wider.

Meanwhile Computer Aided Engineering is also being linked with several other technologies e.g. Internet of Things and Analytics using Artificial Intelligence.

In this presentation we will look at this ongoing development - what is possible on the hardware and software side, including the usage of emerging technologies not just today but also in the future.

FINITE ELEMENT ANALYSIS FOR LOUDSPEAKER DRIVERS AND SYSTEMS: "WHERE AND WHY?"

MATHIEU POBEDA

NEXO

Thursday, October 19

In this presentation, we will look at the big picture of all of the physics involved when designing a loudspeaker driver or system. We will then focus on some (mechanics, acoustics, fluid dynamics, etc.) to see where finite element analysis can be used through standard or optimization methods. We will finally look at what the simulation strategy is and what the benefits can be for an organization to use COMSOL Multiphysics®.

PAVING THE WAY TOWARD INVISIBLE HEARING IMPLANTS

PATRIK KENNES

COCHLEAR TECHNOLOGY CENTRE

Thursday, October 19

While most hearing aids carry sounds through the ear canal to the middle ear, the fully implantable Carina® System connects with the structures of the middle ear and carries sounds directly to the inner ear. During this talk, it will be demonstrated how the COMSOL Multiphysics® software was used to support the development of the different system components: a subcutaneous microphone that captures the sound through the skin, the MicroDrive™ actuator that drives the ossicles, and the inductive link to power the implant.

Carina and MicroDrive are trademarks or registered trademarks of Cochlear Limited.

CFD INTEGRATED IN THE DESIGN OF COMPLEX HYDRAULIC STRUCTURES

ARIE DE NIET

WITTEVEEN+BOS

Friday, October 20

Over the past decade, the increase in model quality and computer power has made it possible to apply computational fluid dynamics to hydraulic structures on a much larger scale. It is accepted more and more by our field and our clients as an essential tool in the design of new hydraulic structures, like navigation locks, discharge facilities, spills, and bridges. CFD is used to optimize a design and to prove that it meets the requirements of the client. In this presentation, we will show how CFD is integrated in several projects at Witteveen+Bos and how it innovates the design process.

MULTIPHYSICS SIMULATION (BEYOND SEMICONDUCTORS) AT STMICROELECTRONICS, ITALY

LUCIA ZULLINO

LUCREZIA GUARINO

STMICROELECTRONICS

Friday, October 20

Microelectronic systems are permeating more and more into our daily life, giving rise to new challenges for technology designers, who must interface their devices with the macroscopic world and sometimes embed them in severe environments. This talk is an overview of how multiphysics simulation is exploited at STMicroelectronics, Italy, to face this scenario in different contexts, including die-package interaction analysis and sophisticated wearable systems design as well as an epitaxial reactor thermofluidic simulation and a force sensor for a concrete integrity monitoring study. A thermomechanical simulation example will be detailed as a test case.and discusses some of the ongoing challenges in such efforts.

COMSOL FUNDAMENTALS

INTRODUCTION TO THE APPLICATION BUILDER

Wednesday October 18, 3:00PM
Speaker: Thorsten Koch

Friday October 20, 12:30PM
Speaker: Thorsten Koch

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 19, 4:30PM
Speaker: Thorsten Koch

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.

SOLVERS: PART 1 UNDERSTANDING THE STATIONARY SOLVERS

Wednesday October 18, 1:00PM
Speaker: Jacob Ystrom

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: PART 2 UNDERSTANDING THE TIME-DEPENDENT SOLVERS

Wednesday October 18, 3:00PM
Speaker: Jacob Ystrom

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: PART 3 UNDERSTANDING SOLVERS AND HARDWARE

Friday October 20, 12:30PM
Speaker: Jacob Ystrom

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 18, 9:00AM
Speaker: Jacob Ystrom

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 19, 4:30PM
Speaker: Tycho van Noorden

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 20, 9:00AM
Speaker: Sven Friedel

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 19, 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 18, 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.

DEPLOYING APPS USING COMSOL SERVER™

Wednesday October 18, 9:00AM
Speaker: Thorsten Koch

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.

HANDS-ON: CORE FUNCTIONALITY

Friday October 20, 9:00AM
Speaker: Frank de Pont

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 18, 3:00PM
Speaker: Magnus Olsson

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 19, 8:30AM
Speaker: Magnus Olsson

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 20, 9:00AM
Speaker: Magnus Olsson

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 20, 12:30PM
Speaker: Magnus Olsson

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 18, 9:00AM
Speaker: Rien Wesselink

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 18, 1:00PM
Speaker: Peter Yakubenko

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 18, 3:00PM
Speaker: Peter Yakubenko

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 19, 4:30PM
Speaker: Kirill Shaposhnikov

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 19, 8:30AM
Speaker: Peter Yakubenko

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 20, 12:30PM
Speaker: Kirill Shaposhnikov

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 19, 8:30AM
Speaker: Mats Nigam

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 19, 4:30PM
Speaker: Mats Nigam

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 18, 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 19, 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: WITH PHASE CHANGE

Friday October 20, 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 20, 9:00AM
Speaker: Tycho van Noorden

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 20, 12:30PM
Speaker: Mats Nigam

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 18, 3:00PM
Speaker: Mats Nigam

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 18, 1:00PM
Speaker: Nicolas Huc

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 18, 9:00AM
Speaker: Hamid Ghanbari

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 18, 1:00PM
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 19, 4:30PM
Speaker: Hamid Ghanbari

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 18, 1:00PM
Speaker: Magnus Björkman

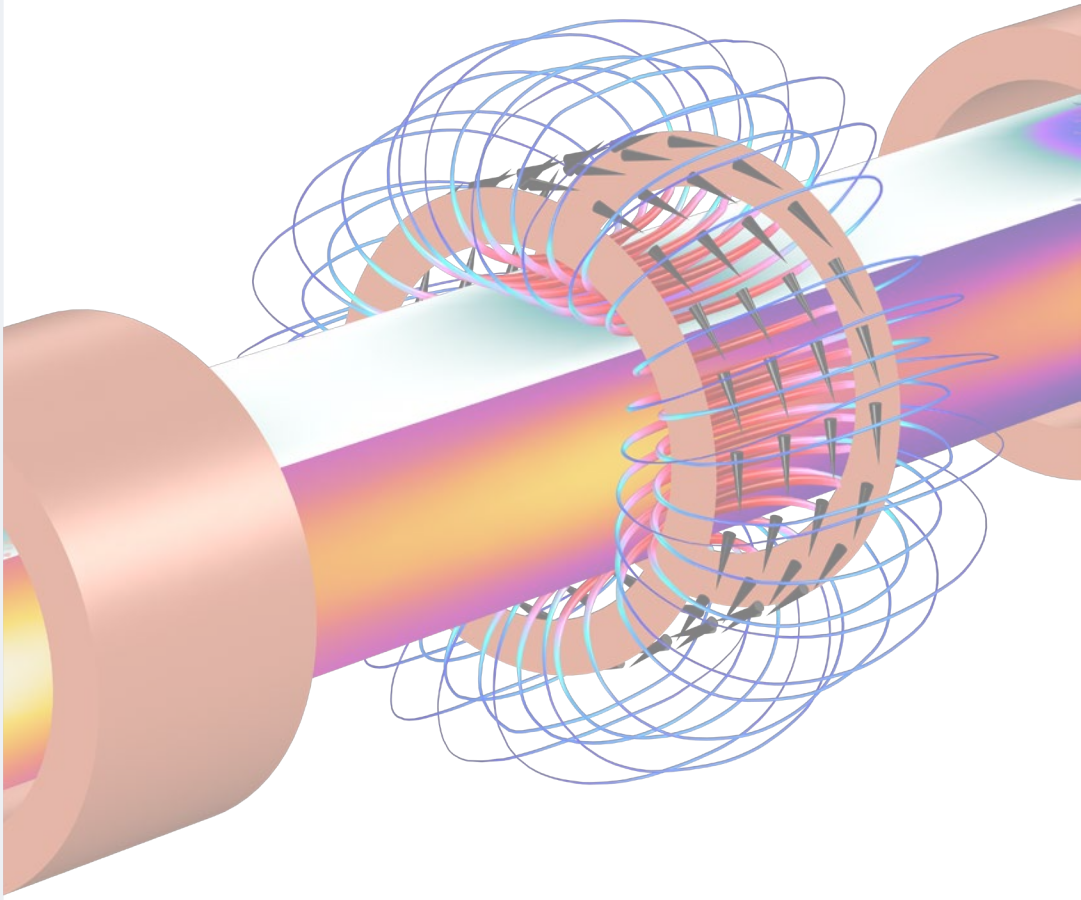
This minicourse will focus on how to interface the MATLAB® and COMSOL Multiphysics® software. Learn how to use MATLAB® as a scripting interface to implement and solve your COMSOL Multiphysics® simulation, export or import your data at the MATLAB® command prompt, and define model properties such as boundary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

SPONSORED WORKSHOPS

SIMPLEWARE - FROM 3D IMAGE TO MESH

Wednesday October 18, 1:00PM
By: Simpleware

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.



THURSDAY **1:00PM-2:30PM** These user presentations happen simultaneously, choose the ones that most interest you!

ELECTROMAGNETICS 1

DIAMOND ROOM
SESSION CHAIR:
Bjorn Sjodin, COMSOL

Determination of NFC-Antenna Operating Distance by COMSOL Multiphysics® Simulation of Planar Transformer Modeling
A. K. Palit [1]
[1] ZF-Lemförder Electronic GmbH, Espelkamp, Germany

Finite Element Method based Investigation of IPMSM Losses
M. Schmidtner [1], C. Markgraf [1], A. Frey [1]
[1] University of Applied Sciences, Augsburg, Bavaria, Germany

EMC Simulation Using Source Reconstruction
A. Bergqvist [1], P. Jacobsson [1]
[1] Volvo Cars, Gothenburg, Sweden

Dynamic Simulation of a Coaxial Magnetic Gear Using Global ODE's and the Rotating Machinery, Magnetic Interface
M. Ostroushko [1], W. Zhang [1], W. M. Rucker [1]
[1] Institute of Theory of Electrical Engineering, University of Stuttgart, Stuttgart, Germany

Analysis of Electromagnetic Behavior of Permanent Magnetized Electrical Machines in Fault Modes
M. U. Hassan [1], R. Nilssen [1], A. Røkke [2]
[1] Department of Electrical Power Engineering, NTNU, Trondheim, Norway
[2] Rolls Royce Marine AS, Trondheim, Norway

ACOUSTICS AND VIBRATIONS 1

PENN ROOM
SESSION CHAIR:
Marten Nijhof, TNO

3D Acoustic-Structure Interaction of Ultrasound in Fluids for the Manufacture of Graded Materials
J. Holt [1], C. Torres-Sanchez [1], P. Conway [1], M. G. Garcia-Romero [1]
[1] The Wolfson School of Mechanical, Electrical and Manufacturing Engineering, Loughborough University, Leicestershire, UK

Considerations Regarding the Design of a Power Ultrasonic Transducer with Flat Rectangular Plate
R. R. Andrés [1], E. Riera [1]
[1] Grupo de Sistemas y Tecnologías Ultrasónicas, ITEFI, CSIC, Madrid, España

Time-Dependent Study of Pressure Waves Generated by Square Array MEMS Ultrasound Transducers
M. A. G. Suijlen [1], R. J. Woltjer [1]
[1] Novioscan, Nijmegen, Netherlands

A Multi-Physics Study of the Wave Propagation Problem in Open Cell Polyurethane Foams
M. Dossi [1], M. Brennan [1], M. Moesen [1]
[1] Huntsman Polyurethanes, Everberg, Belgium

Damping in Dense Gas Acoustic Structure Interaction
J. P. M. Smeulers [1], H. P. Pereboom [1], N. González Díez [1]
[1] TNO, Delft, The Netherlands

BATTERIES, FUEL CELLS, AND ELECTROCHEMICAL PROCESSES

VAN WALSUM ROOM
SESSION CHAIR:
Markus Ganser, Robert Bosch GmbH

Evaluation of Design Options for Tubular Redox Flow Batteries
T. Struckmann [1], M. William Nix [1], S. Ressel [1]
[1] Hamburg University of Applied Sciences, Department of Mechanical Engineering and Production Management, Hamburg, Germany

2-D Modeling of CO2 Electrolysis Using Gas Diffusion Electrode Operate at Neutral pH and Mild Conditions
A. Monteverde Videla [1], N. Vasile [1], G. Saracco [1]
[1] Istituto Italiano di Tecnologia, Centre for Sustainable Future Technologies, Turin, Italy

Approximation of the Flow Field in Electrochemical Machining Incorporating Pressure Drop Calculation
R. Paul [1], M. Zinecker [1], M. Hackert-Oschätzchen [1], A. Schubert [1]
[1] Professorship Micromanufacturing Technology, Chemnitz University of Technology, Chemnitz, Germany

Multiscale Model of the PECM with Oscillating Cathode for External Geometries Using a Virtual Switch
I. Schaarschmidt [1], M. Zinecker [1], M. Hackert-Oschätzchen [1], A. Schubert [1], G. Meichsner [2]
[1] Professorship Micromanufacturing Technology, Chemnitz University of Technology, Chemnitz, Germany
[2] Fraunhofer Institute for Machine Tools and Forming Technology, Chemnitz, Germany

Copper Electrochemical Polishing Optimisation
A. Pérez Rodríguez [1], L. Marques Antunes Ferreira [1]
[1] CERN, Geneva, Switzerland

BIOSCIENCE AND BIOENGINEERING

LEEUWEN ROOM
SESSION CHAIR:
Ismael Rattalino, Sorin Group Italia s.r.l.

Simulating Organogenesis in COMSOL Multiphysics®: Tissue Mechanics during Organ Growth
M. Peters [1], D. Iber [1]
[1] D-BSSE, ETH, Zurich, Switzerland

Simulating Organogenesis in COMSOL Multiphysics®: Comparison of Methods for Simulating Branching Morphogenesis
L. D. Wittwer [1], M. Peters [1], S. Aland [2], D. Iber [1]
[1] ETH Zürich, Zurich, Switzerland
[2] University of Applied Sciences, Dresden, Germany

COMSOL Multiphysics® Used for Simulating Biological Remodeling
S. Di Stefano [1], A. Grillo [1], M. Carfagna [1], M. Knodel [1]
[1] Politecnico di Torino, Turin, Italy

Simulation of CMOS Compatible Sensor Structures for Dielectrophoretic Biomolecule Immobilization
H. Matbaechi Ettehad [1], S. Guha [1], C. Wenger [1]
[1] IHP, Frankfurt (Oder), Brandenburg, Germany

Biologic Tissues Properties Deduction Using an Opto-Mechanical Model of the Human Eye
A. V. Maurer [1], D. P. Enfrun [1], C. O. Zuber [1], R. Rozsnyo [2]

Investigating the Loading Behaviour of Intact and Meniscectomy Knee Joints and the Impact on Surgical Decisions
M. S. Yeoman [1]
[1] Continuum Blue Ltd., Cardiff, United Kingdom

CHEMICAL REACTION ENGINEERING

GOUDRIAAN ROOM
SESSION CHAIR:
Dmitry Lazarev, COMSOL

Iron Ore Sintering Process Model to Study Local Permeability Control
Y. Kaymak [1], T. Hauck [1], M. Hillers [2]
[1] VDEh Betriebsforschungsinstitute GmbH, Düsseldorf, Germany
[2] Shuangliang Clyde Bergemann GmbH, Ratingen, Germany

A Flow and Transport Model for Low-Temperature Gaseous Nitrocarburizing of Stainless Steels
J. Feng [1], M. Wettlaufer [1]
[1] Centre of Materials Engineering, Heilbronn University, Heilbronn, Germany

THURSDAY **1:00PM-2:30PM** These user presentations happen simultaneously, choose the ones that most interest you!

Model Based Stimulus Experiments to Improve Biological Wastewater Treatment Performance
N. Do [1], M. Stich [1]
[1] Non-linearity and Complexity Research Group, System Analytics Research Institute, School of Engineering and Applied Science, Aston University, Birmingham, United Kingdom

Validation of COMSOL Multiphysics® for PWR Power Distribution via 3D IAEA PWR Benchmark Problem
A. Y. Soliman [1]
[1] Department of Nuclear Engineering, King Abdulaziz University, Jeddah, Saudi Arabia Kingdom

Predictive Model for UV Light Irradiation and PCO Reaction Kinetics in a Photocatalytic Reactor
S. Denys [1], J. Roegiers [1], J. van Walsem [1]
[1] University of Antwerp, Antwerp, Belgium

HEAT TRANSFER 1

MEES AUDITORIUM
SESSION CHAIR:
Paolo Caronna, COMSOL

Coupled Heat, Moisture and CFD Modeling in the Built Environment
K. Kompatscher [1], S. Kochen [1], A. M. W. van Schijndel [1], H. L. Schellen [1]
[1] Department of the Built Environment, Eindhoven University of Technology, Eindhoven, The Netherlands

Modeling of Horizontal GSHP System for Greenhouse
M. Aydin [1], A. Gultekin [1]
[1] Energy Institute, Istanbul Technical University, Istanbul, Turkey

Heat and Moisture in Wooden Bearings of Monuments
H. L. Schellen [1], M. Spierenburg [2], A. W. M. van Schijndel [1]
[1] Eindhoven University of Technology, Eindhoven, The Netherlands
[2] 2DPA Cauberg-Huygen, Amsterdam, The Netherlands

Simulating the Effect of Groundwater Flow and Heterogeneity on Borehole Thermal Energy Storage
M. Possemiers [1], L. De Henau [1], J. Van Steenwinkel [1]
[1] AGT - Advanced Groundwater Techniques, Aartselaar, Belgium

GEOPHYSICS AND GEOMECHANICS

J. F. STAAL ROOM
SESSION CHAIR:
Robbie Balcombe, COMSOL

3D Modeling of the In-Situ Stress Field in Nordland, Northern Norway
S. Gradmann [1], Y. Maystrenko [1], M. Keiding [1], O. Olesen [1]
[1] Geological Survey of Norway, Trondheim, Norway

A 3D Multiphase Flow Model of Hydrogen Storage in Geological Formations
E. Abarca [1], A. Sainz-Garcia [1], F. Grandia [1]
[1] Amphos [21] Consulting S.L., Barcelona, Spain

Simulation of the Transport Phenomena in the Horstberg Geothermal System
A. Hassanzadegan [1], T. Tischner [1]
[1] Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany

Heat Transfer Modeling for Thermal Stimulation of Near Wellbore Using COMSOL Multiphysics®
M. Mohammed [1]
[1] Freiberg University of Mining and Technology, Sachsen, Germany

Analytical Solution for the Steady Poroelastic State under Influence of Gravity
E. Holzbecher [1]
[1] German University of Technology in Oman, Muscat, Oman

Exergy Analysis of Polymer Flooding in Clastic Reservoirs
A. Hassan [1], H. Bruining [2], T. Musa [3], R. Farajzadeh [2]
[1] Delft University of Technology, Delft, The Netherlands, and Sudan University of Science and Technology, Khartoum, Sudan
[2] Delft University of Technology, Delft, The Netherlands
[3] Sudan University of Science and Technology, Khartoum, Sudan

HEAT TRANSFER AND PHASE CHANGE

VAN OLDENBARNEVELT ROOM
SESSION CHAIR:
Lars Fromme, Fachhochschule Bielefeld

Transient Process Simulation of Heat Transfer in Laser Beam Welding with an Equivalent Heat Source
A. Artinov [1], M. Bachmann [1], M. Rethmeier [1]
[1] BAM Federal Institute for Material Research and Testing, Berlin, Germany

Optimization of an Explosive Mixture Cooling Process Including a Phase Change
J. D. Wheeler [1], P. Namy [1], C. Coulouarn [2], E. Benade [2]
[1] SIMTEC, Grenoble, France
[2] TDA Armements, LA-FERTÉ-SAINT-AUBIN, France

Natural Convection Effects on the Solidification in Cylinders at Different Filling Percentages
R. Bourisli [1], A. Alshayji [1]
[1] Kuwait University, Kuwait City, Kuwait

Simulation of Dynamic Thermal Fields Assisting DMLS Additive Manufacturing of Biocompatible Ti-Alloy
E. Lacatus [1], G. C. Alecu [2], M. Sopronyi [3]
[1] Polytechnic University of Bucharest, Bucharest, Romania
[2] Groupe Renault, Bucharest, Romania
[3] National Institute for Laser, Plasma and Radiation Physics (INFLPR), Magurele, Romania

STRUCTURAL MECHANICS AND THERMAL STRESSES

BLUE ROOM
SESSION CHAIR:
Kirill Shaposhnikov, COMSOL

Design Criteria of the Passive Joints in Underactuated Modular Soft Hands
M. Malvezzi [1], G. Salvietti [1], I. Hussain [2], D. Prattichizzo [1], Z. Iqbal [2]
[1] University of Siena, Siena, Italy; Istituto Italiano di Tecnologia, Genova, Italy
[2] University of Siena, Siena, Italy

Multiphysics Simulations for the Design of a Superconducting Magnet for Proton Therapy
C. Calzolaio [1], H. Carolin [1], S. Stephane [1]
[1] Paul Scherrer Institut, Villigen, Switzerland

Simulation of Compaction in Asphaltic Mixtures, Part I: Gyratory Compactor
A. Alipour [1], S. D. Mookhoek [1]
[1] Department of Structural Reliability, TNO, Delft, The Netherlands

Phase Transformation and Deformation Model for Quenching Simulations
Y. Kaymak [1]
[1] VDEh Betriebsforschungsinstitute GmbH, Düsseldorf, Germany

THURSDAY **2:45PM-4:15PM** These user presentations happen simultaneously, choose the ones that most interest you!

ELECTROMAGNETICS 2

DIAMOND ROOM
SESSION CHAIR:
Guoyan Sun, Brugg Kabel AG

Predicting the Parasitic Forces in the Magnetically Levitated Adaptive Optics Mirrors
C. Del Vecchio [1], R. Briguglio [1], A. Riccardi [1], M. Xompero [1]
[1] National Institute for Astrophysics, Arcetri Astrophysical Observatory, Florence, Italy

Green's Function Approach to Efficient 3D Electrostatics of Multi-Scale Problems
C. Roman [1], L. Schmid [1], L. Stolpmann [1], C. Hierold [1]
[1] ETH, Zurich, Switzerland

Impact of the Forces due to CLIQ Discharges on the New HL-LHC Beam Screen
M. Morrone [1], C. Garion [1]
[1] CERN, Geneva, Switzerland

A Multiphysics Model to Ensure Power Cables are Restrained Safely During Short Circuit Fault
M. S. Yeoman [1], R. J. Varley [1], R. Damodharan [1], L. Frizzell [2]
[1] Continuum Blue Ltd., Cardiff, United Kingdom
[2] CMP Products Ltd., Cramlington, United Kingdom

Nonlinear Shielded Multipair Twisted Railway Cable Modeling with COMSOL Multiphysics®
Y. Jin [1], G. Papaiz Garbini [1], S. Karoui [1], M. Cucchiaro [1]
[1] SNCF Réseau, Paris, France

ACOUSTICS AND VIBRATIONS 2

PENN ROOM
SESSION CHAIR:
Jan-Jaap Koning, TU Eindhoven

Topology Optimization of Thermoviscous Acoustics in Tubes and Slits with Hearing Aid Applications
R. Christensen [1]
[1] GN ReSound A/S, Ballerup, Copenhagen, Denmark

Effective Properties of Viscoelastic Composite with Piezoelectric Fibers
M. Al-Ajmi [1], P. Muthusamy [1]
[1] Mechanical Engineering Department, Kuwait University, Kuwait

Topology Optimization of a Gaseous Photoacoustic Spectroscopy Cell Using COMSOL Multiphysics®
R. Haouari [1], V. Rochus [2], L. Lagae [1], X. Rottenberg [2]
[1] Imec & KU Leuven, Leuven, Belgium
[2] Imec, Leuven, Belgium

Frequency Response of Soil-structure Interaction for Concrete Gravity Dams
A. De Falco [1], M. Mori [1], G. Sevieri [2]
[1] University of Pisa, Pisa, Italy
[2] University of Florence, Florence, Italy

OPTICS, PHOTONICS, RF AND MICROWAVE ENGINEERING

VAN WALSUM ROOM
SESSION CHAIR:
Johan Slot, Royal DSM/Eindhoven University of Technology

COMSOL Multiphysics® Simulations to Study Nonlocal Properties of a Au Nanoshell Using Quantum Hydrodynamic Theory
M. Khalid [1], C. Ciracì [1]
[1] Center for Biomolecular Nanotechnologies, Istituto Italiano di Tecnologia, Arnesano, Italy

Evaluating Nanogaps in Ag and Au Nanoparticle Clusters for SERS Applications Using COMSOL Multiphysics®
R. Asapu [1], R. Ciocarlan [2], N. Claes [3], N. Blommaerts [1], S. Bals [3], P. Cool [2], S. Denys [1], S. Lenaerts [1], S. W. Verbruggen [1]
[1] Department of Bioscience Engineering, DuEL Research Group, University of Antwerp, Belgium
[2] Department of Chemistry, PLASMANT Research Group, University of Antwerp, Belgium
[3] Department of Physics, EMAT Research Group, University of Antwerp, Belgium

Virtual Long Term Testing of High-Power Fiber Lasers
J. Schüttler [1], B. Neumann [1], S. Belke [1], F. Becker [1], S. Ruppik [1]
[1] Coherent | ROFIN, Hamburg, Germany

Modelling Microwave Scattering from Rough Sea Ice Surfaces
X. Xu [1], A. P. Doulgeris [1], F. Melandsø [1], C. Brekke [1]
[1] Department of Physics and Technology, UiT The Arctic University of Norway, Tromsø, Norway

Tunable Metamaterial-Inspired Resonators for Optimal Wireless Power Transfer Schemes
A. X. Lalas [1], N. V. Kantartzis [2], T. T. Zygiridis [3], T. P. Theodoulidis [4]
[1] Information Technologies Institute, Centre of Research & Technology - Hellas, 6th km Harilaou - Thermi, Thessaloniki, Greece
[2] Department of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Thessaloniki, Greece
[3] Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Kozani, Greece
[4] Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece

CHEMICAL ENGINEERING AND MICROFLUIDICS

GOUDRIAAN ROOM
SESSION CHAIR:
Mats Nigam, COMSOL

Reactive Transport Modeling of CO2 in Carbonate Rocks: Single Pore Model
P. Agrawal [1], J. Koskamp [1], A. Raoof [1], M. Wolthers [1]
[1] Utrecht University, Utrecht, The Netherlands

On the Modeling and Simulation of Electroosmotic Micropump for Biomedical Applications
M. Badran [1]
[1] Future University in Egypt, Cairo, Egypt

Non-linear DC Electrophoresis in High Electric Field Conditions
E. Ruiz-Reina [1], F. Carrique [1]
[1] University of Málaga, Málaga, Spain

Modeling and Simulation of Hydrogen Generation in Membrane Reactor via Steam Octane Reforming
N. Ghasem [1], A. Y. Alraeesi [1]
[1] UAE Univeristy, Alain, United Arab Emirates

Sensitivity Analysis of CPP's for Solvent Removal Process of a API-Protein Bonded Nano-Suspension
C. C. Huang [1], T. Liu [1], F. Faassen [1]
[1] Teva Pharmachemie B.V., Haarlem, The Netherlands

CFD

MEES AUDITORIUM
SESSION CHAIR:
Magnus Olsson, COMSOL

Compressible Flow Modelling Applied to Depressurization Process
V. Bruyère [1], T. Paris [2], P. Namy [1]
[1] SIMTEC, Grenoble, France
[2] CEA DAM, Is-sur-Tille, France

Fluid Dynamics Modeling of an Industrial Wet Chemical Process Bath for the Si-Solar Cell Production
L. Mohr [1], M. Zimmer [1], A. Moldovan [1], M. Menschick [2], B. Mandlmeier [2]
[1] Fraunhofer Institut for Solar Energy Systems ISE, Freiburg, Germany
[2] Singulus Technology AG, Fürstenfeldbruck, Germany

THURSDAY **2:45PM-4:15PM** These user presentations happen simultaneously, choose the ones that most interest you!

Simulation of Slag/Gas and Slag/Iron Interface Tilting in Blast Furnace Hearth During Slag Tapping
Y. Kaymak [1], T. Hauck [1], R. Lin [2], H. Rausch [2]
[1] VDEh Betriebsforschungsinstitute GmbH, Düsseldorf, Germany
[2] AG der Dillinger Hüttenwerke, Dillingen, Germany

Some Benchmark Simulations for Flash Flood Modeling
E. Holzbecher [1], A. Hadidi [1]
[1] German University of Technology in Oman, Muscat, Oman

Extended Physics Modeling of the Resin Flow During Vacuum Infusion Processes
J. Stolz [1], P. Fideu [2], A. Herrmann [1]
[1] Faserinstitut Bremen e.V., Bremen, Germany
[2] Airbus Operations GmbH, Hamburg, Germany

PLASMA PHYSICS

J. F. STAAL ROOM
SESSION CHAIR:
Magnus Björkman, COMSOL

A Plasma Torch Model
B. Chiné [1]
[1] Costa Rica Institute of Technology, School of Materials Science and Engineering, Cartago, Costa Rica

Simulation and Visualisation of Shielding Gas Flows During Wire-Arc Additive Manufacture
I. Bitharas [1], A. Moore [1]
[1] Heriot-Watt Univerisity, Edinburgh, UK

Simulation of an Impulse Arc Discharge in Line Lightning Protection Devices
A. Chusov [1], E. Rodikova [2], D. Belko [1]
[1] Streamer Electric Inc., Saint Petersburg, Russia
[2] Streamer Electric Inc. and Saint Petersburg State University, St. Petersburg, Russia

Three-Dimensional Numerical Simulation of Arc Motion Between Bus-Bar Electrodes
M. Lisnyak [1], M. Chnani [2], A. Gautier [2], J.-M. Bauchire [1]
[1] Université d'Orléans, Orléans, France
[2] Zodiac Aero Electric, Zodiac Aerospace, Montreuil, France

HEAT TRANSFER 2

VAN OLDENBARNEVELT ROOM
SESSION CHAIR:
Bernd Baumann, Hamburg University of Applied Sciences

Thermal Modeling for On-Interposer Thermoelectric Sensors
C. Morel [1], G. Savelli [1]
[1] CEA, Grenoble, France

Level-Set based Topology Optimisation of Convectively Cooled Heatsinks
M. S. Santhanakrishnan [1], T. Tilford [1], C. Bailey [1]
[1] The University of Greenwich, London, United Kingdom

Using COMSOL Multiphysics® for Theoretical and Experimental Validation of Critical Properties of Composite Process
A. Häberle [1], P. Fideu [2], A. Herrmann [1]
[1] CTC GmbH, Stade, Lower Saxony, Germany
[2] Airbus Operations GmbH, Hamburg, Hamburg, Germany

Implementation of an Active Fluid Cooling Design in a 48 V High-Power Battery Module
Z. Wu [1], A. Stawarski [2], H. Kemper [2]
[1] Energy Storage Systems, FH Aachen - University of Applied Sciences, Aachen, Germany; RWTH Aachen University, Aachen, Germany
[2] Energy Storage Systems, FH Aachen - University of Applied Sciences, Aachen, Germany

PARTICLE TRACING IN ELECTROMAGNETIC FIELDS

BLUE ROOM
SESSION CHAIR:
Ad van der Linden, COMSOL

Innovation of Combustion Particle Control Technologies Assisted by Numerical Modeling
D. Rubinetti [1]
[1] Institute of Biomass and Resource Efficiency, University of Applied Sciences and Arts Northwestern Switzerland, Windisch, Switzerland

Meshing Challenges in Simulating the Induced Currents in Vacuum Phototriode
S. Zahid [1], P. R. Hobson [1]
[1] Brunel University London, London, United Kingdom

Electron Trajectories in Scanning Field-Emission Microscopy
H. Cabrera [1]
[1] Swiss Federal Institute of Technology, Zurich, Switzerland

Modeling and Analysis of Aberrations in Electron Beam Melting (EBM) Systems
D. Svensson [1], A. Azhirnian [2]
[1] Arcam AB, Mölndal, Sweden
[2] Chalmers University of Technology, Gothenburg, Sweden

COMSOL APPLICATIONS AND SIMULATION METHODS

VAN DER VEEKEN ROOM
SESSION CHAIR:
Frank de Pont, COMSOL

Getting State-Space Models from FEM Simulations
A. W. M. van Schijndel [1]
[1] Eindhoven University of Technology, Eindhoven, The Netherlands

How Apps Can Support COMSOL Multiphysics® Users?
G. Petrone [1], C. Barbagallo [1]
[1] BE CAE & Test, Catania, Italy

A Standalone Interface for Web-Based Virtual Reality of Calculated Fields
M. Jüttner [1], N. Zhao [1], S. Grabmaier [1]
[1] University of Stuttgart, Institute for Theory of Electrical Engineering, Stuttgart, Germany

Simulation Methods on Virtual Laboratories for Characterization of Functionalized Nanostructures
E. Lacatus [1], G. C. Alecu [2], A. Tudor [3], M. Sopronyi [4]
[1] Polytechnic University of Bucharest, Bucharest, Romania
[2] Groupe Renault, Bucharest, Romania
[3] STAR STORAGE, Bucharest, Romania
[4] National Institute for Laser, Plasma and Radiation Physics, Magurele, Romania
[5] Polytechnic University of Bucharest, Bucharest, Romania

New to the conference program this year is the addition of Panel Discussions. These sessions are designed to encourage conversation in an interactive setting while we learn about industry trends, design challenges, and best practices within medical product design and acoustics simulation.

Heat Transfer Modeling and Simulation

Thursday, October 19th
1:00pm – 2:30pm

Heat transfer simulations are widely used in the design of electronic devices, medical implants, engines, and batteries, to name a few. We will discuss the state-of-the art capabilities in heat transfer simulations, and how effectively they are used in various industries. The industry panellists will share their insights from simulating and designing a wide range of processes and products. A COMSOL panellist will also provide his perspective and answer technical questions related to the use of COMSOL Multiphysics.

MODERATOR:

Jos van Schijndel,
University of Technology Eindhoven

PANELIST:

Nicolas Huc
COMSOL

PARTICIPANTS:

Giuseppe Petrone
BE CAE & Test

Patrick Kennes
Cochlear

Acoustics Modeling and Simulation

Thursday, October 19th
2:45pm – 4:15pm

Acoustics simulations are widely used in the design of sensors and actuators, loudspeakers, noise control devices, and musical instruments, to name a few. We will discuss the state-of-the-art capabilities in acoustic simulations, and how effectively they are used in various industries. The industry panelists will share their insights from designing a wide range of products (loudspeakers, acoustic transducers, MEMS devices, and lab-on-a-chip devices). A COMSOL panelist will also provide his perspective and answer technical questions related to the use of COMSOL Multiphysics.

MODERATOR:

Marten Nijhof
TNO

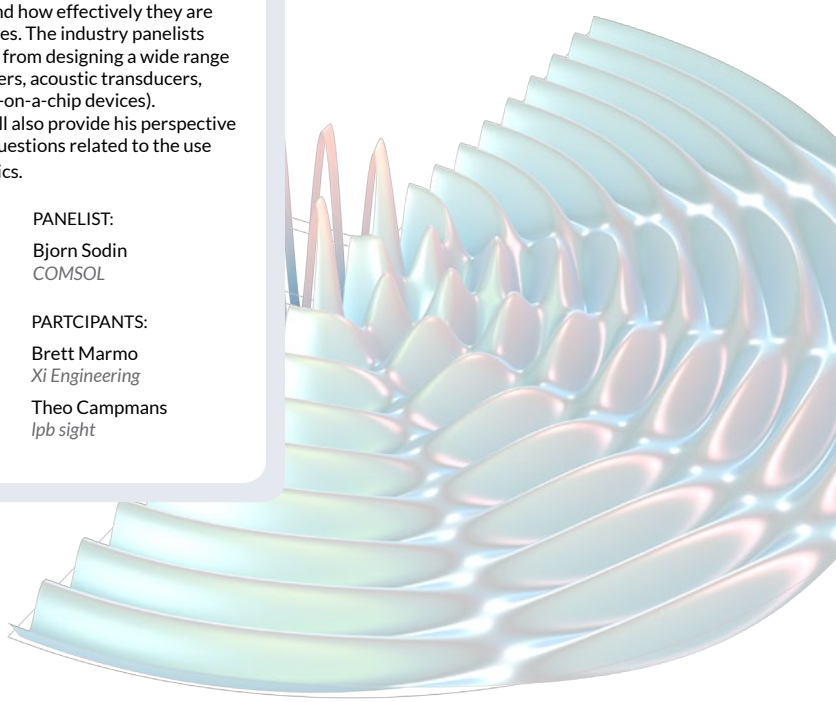
PANELIST:

Bjorn Sodin
COMSOL

PARTCIPANTS:

Brett Marmo
Xi Engineering

Theo Campmans
Ipb sight



Effect of KFm Airfoils Application on Aerodynamic Characteristics on the Example of NACA 0012

R. Szczepaniak [1], R. Bąbel [1]
[1] Polish Air Force Academy, Aeronautics Faculty, Deblin, Poland

Interaction of Microparticles in a Miniaturized Vacuum-Cleaner

I. S. M. Jimidar [1], Y. Vanderheyden [1], H. Gardeniers [2], G. Desmet [1]
[1] Vrije Universiteit Brussel, Department of Chemical Engineering, Brussels, Belgium

Modeling and Simulation of Redox Titration of Metal Oxides at Porous Microelectrodes

L. Balboa [1], M. Hänsch [1], J. Behnken [1], G. Wittstock [1]
[1] Institute of Chemistry, Carl von Ossietzky University of Oldenburg, Oldenburg, Germany

Study of a Loudspeaker in a Vehicle Door

M. K. Bogdanski [1], F. Malbos [2], M. Strauss [1]
[1] Harman Becker Automotive Systems, VPDT, Straubing, Germany
[2] Harman France, VPDT, Paris, France

iCP Apps to Readily Solve Reactive Transport Simulations in COMSOL Multiphysics®

D. Negro [1], A. Sainz-Garcia [2], D. Sampietro [1], E. Coene [1], E. Abarca [1], A. Idiart [1], M. Laviña [1], O. Silva [1], J. Molinero [1]

Analysis of Asphalt Solar Collectors Using a Finite Element Approach

G. Guldentops [1], C. Vuye [2], S. Arimilli [2]
[1] Department of Civil Engineering, Worcester Polytechnic

CFD Simulations to Improve Protein Separation Introducing a Permeable Surface with Periodic Grooves

M. Marioli [1], W. Th. Kok [1]
[1] Analytical Chemistry Group, van't Hoff Institute for Molecular Sciences, University of Amsterdam, The Netherlands

A Multi-physical Approach of a Sterilization System for Aseptic Food Processing

Z. B. Jildeh [1], P. Kirchner [2], T. Rydlewski [2], C. Hollenbeck [2], T. Wagner [3], P. H. Wagner [4], M. J. Schöning [3]
[1] Imagine Engineering GmbH, Bergheim, Germany; Institute of Nano- and Biotechnologies (INB), FH Aachen, Jülich, Germany; Soft Matter and Biophysics, Catholic University, Leuven, Belgium
[2] Imagine Engineering GmbH, Bergheim, Germany
[3] Institute of Nano- and Biotechnologies (INB), FH Aachen, Jülich, Germany
[4] Soft Matter and Biophysics, Catholic University, Leuven, Belgium

Iron Ore Sintering Process Model to Study Local Permeability Control

Y. Kaymak [1], T. Hauck [1], M. Hillers [2]
[1] VDEh Betriebsforschungsinstitute GmbH, Düsseldorf, Germany
[2] Shuangliang Clyde Bergemann GmbH, Ratingen, Germany

Phase Transformation and Deformation Model for Quenching Simulations

Y. Kaymak [1]
[1] VDEh Betriebsforschungsinstitute GmbH, Düsseldorf, Germany

Numerical Calculation of the Three Dimensional Inter-Bar Current Distribution in Induction Machines

J. Güdelhöfer [1], R. Gottkehaskamp [1], A. Möckel [2]
[1] University of Applied Sciences Düsseldorf, Düsseldorf, Germany
[2] Technical University of Ilmenau, Ilmenau, Germany

Simulation of Eddy Current Non Destructive Testing using COMSOL Multiphysics®

A. Kyrgiazoglou [1], T. Theodoulidis [1]
[1] Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece

COMSOL® Analysis for Duct Acoustic

M. M. Ghulam [1], E. J. Gutmark [1]
[1] Aerospace Department, University of Cincinnati, Cincinnati, OH, USA

Multiphysical Simulation of an Induction Sealing Process for Cups with Laminated Aluminum Foil

C. Hollenbeck [1], Z. Jildeh [1], P. Kirchner [1], T. Rydlewski [1]
[1] Imagine Engineering GmbH, Bergheim, Germany

Multiphysical Simulation of Moved Data Cable

M. Raum [1]
[1] Friedrich-Alexander Universität, Erlangen, BY, Germany

Coupled Optical & Thermal Model of a Silicon Microprobe

Cs. Ö. Boros [1], Sz. Beleznai [1], P. Koppa [1], Z. Fekete [2], Á. Cs. Horváth [3]
[1] Department of Atomic Physics, Budapest University of Technology and Economics, Budapest, Hungary
[2] MTA EK NAP B Research Group for Implantable Microsystems, Budapest, Hungary
[3] Óbuda University Doctoral School of Material Science & Technology, Budapest, Hungary

CMOS Based Atom Chips for Sensor Applications

Ph. Neuman [1], A. Nemecek [1], C. Koller [2]
[1] Department for Micro-and Nanosystems, University of Applied Sciences Wiener Neustadt, Austria
[2] Department for Micro-and Nanosystems, University of Applied Sciences Wiener Neustadt, Austria, and School of Physics and Astronomy, University of Nottingham, Nottingham, UK

Near-Field of Resonating Piezoelectric Membrane Used as Ultrasound Transducer

V. Tzanov [1], J. Munoz [1], F. Torres [1], N. Barniol [1]
[1] Universitat Autonoma de Barcelona, Bellaterra, Spain

CFD Investigation of Cross Bubbly Flow through a Bubble Column with Rectangular Geometry

N. M. Musa [1], D. Kuvshinov [1], P. Rubini [1]
[1] The University of Hull, Hull, East Yorkshire, United Kingdom

Oxygen Based Diffusion Modeling of Oxidation Behaviour of Encapsulated Lipids

H. Teichmann [1], A. Linke [1], R. Kohlus [1]
[1] Process Engineering and Food Powders, University of Hohenheim, Stuttgart, BW, Germany

Numerical Simulation of PCB-Coil-Layouts for Inductive Energy Transfer Systems

D. Maier [1], N. Lucht [1], A. Enssle [1], A. Lusiewicz [1], J. Fischer [1], U. Pecha [1], N. Parspour [1]
[1] Stuttgart University, Institute of Electrical Energy Conversion, Stuttgart, Germany

Modeling of the Clamping Fixture of a Piezoelectric Cantilever-type Energy Harvesting Device

T. Hoang [1,2], G. Poulin-Vittrant [2], G. Ferin [1], F. Levassort [2], C. Bantignies [1], A. Nguyen-Dinh [1], M. Bavencoffe [2]
[1] Advanced Research dept., VERMON S.A., Tours, France
[2] GREMAN UMR 7347, Université de Tours, CNRS, INSA Centre Val de Loire, Blois, France

A Novel Free-standing Evanescent Waveguide for Sensing

X. Meng [1], Y. Xin [1], P. French [1]
[1] Department of Microelectronics, Delft University of Technology, Delft, Netherland

Simulation of Slag/Gas and Slag/Iron Interface Tilting in Blast Furnace Hearth During Slag Tapping

Y. Kaymak [1], T. Hauck [1], R. Lin [2], H. Rausch [2]
[1] VDEh Betriebsforschungsinstitute GmbH, Düsseldorf, Germany
[2] AG der Dillinger Hüttenwerke, Dillingen, Germany

Coupled Heat, Moisture and CFD Modeling in the Built Environment

K. Kompatscher [1], S. Kochen [1], A. M. W. van Schijndel [1], H. L. Schellen [1]
[1] Department of the Built Environment, Eindhoven University of Technology, Eindhoven, The Netherlands

Biologic Tissues Properties Deduction Using an Opto-Mechanical Model of the Human Eye

A. V. Maurer [1], D. P. Enfrun [1], C. O. Zuber [1], R. Rozsnyo [2]
[1] R&D, Kejako, Plan-les-ouates, GE, Switzerland
[2] MNCM, HES-SO, GE, Switzerland

Extended Physics Modeling of the Resin Flow During Vacuum Infusion Processes

J. Stolz [1], P. Fideu [2], A. Herrmann [1]
[1] Faserinstitut Bremen e.V., Bremen, Germany
[2] Airbus Operations GmbH, Hamburg, Germany

Methodology for Numerical Modeling of TSA Coated Corrosion Sample Coupons

D. Cocco [1]
[1] LIC Energy UK, Bristol, UK

Implementation of an Active Fluid Cooling Design in a 48 V High-Power Battery Module

Z. Wu [1], A. Stawarski [2], H. Kemper [2]
[1] Energy Storage Systems, FH Aachen - University of Applied Sciences, Aachen, Germany; RWTH Aachen University, Aachen, Germany
[2] Energy Storage Systems, FH Aachen - University of Applied Sciences, Aachen, Germany

Frequency Response of Soil-structure Interaction for Concrete Gravity Dams

A. De Falco [1], M. Mori [1], G. Sevieri [2]
[1] University of Pisa, Pisa, Italy
[2] University of Florence, Florence, Italy

Nonlinear Shielded Multipair Twisted Railway Cable Modeling with COMSOL Multiphysics®

Y. Jin [1], G. Papaiz Garbini [1], S. Karoui [1], M. Cucchiaro [1]
[1] SNCF Réseau, Paris, France

Modeling of Horizontal GSHP System for Greenhouse

M. Aydin [1], A. Gultekin [1]
[1] Energy Institute, Istanbul Technical University, Istanbul, Turkey

Design Criteria of the Passive Joints in Underactuated Modular Soft Hands

M. Malvezzi [1], G. Salvietti [1], I. Hussain [2], D. Prattichizzo [1], Z. Iqbal [2]
[1] University of Siena, Siena, Italy; Istituto Italiano di Tecnologia, Genova, Italy
[2] University of Siena, Siena, Italy

Simulation Methods on Virtual Laboratories for Characterization of Functionalized Nanostructures

E. Lacatus [1], G. C. Alecu [2], A. Tudor [3], M. Sopronyi [4]
[1] Polytechnic University of Bucharest, Bucharest, Romania
[2] Groupe Renault, Bucharest, Romania
[3] STAR STORAGE, Bucharest, Romania
[4] National Institute for Laser, Plasma and Radiation Physics, Magurele, Romania
[5] Polytechnic University of Bucharest, Bucharest, Romania

Three-Dimensional Numerical Simulation of Arc Motion Between Bus-Bar Electrodes

M. Lisnyak [1], M. Chnani [2], A. Gautier [2], J.-M. Bauchire [1]
[1] Université d'Orléans, Orléans, France
[2] Zodiac Aero Electric, Zodiac Aerospace, Montreuil, France

Investigating the Loading Behaviour of Intact and Meniscectomy Knee Joints and the Impact on Surgical Decisions

M. S. Yeoman [1]
[1] Continuum Blue Ltd., Cardiff, United Kingdom

Investigating the Loading Behaviour of Intact and Meniscectomy Knee Joints and the Impact on Surgical Decisions

M. S. Yeoman [1]
[1] Continuum Blue Ltd., Cardiff, United Kingdom

Some Benchmark Simulations for Flash Flood Modeling

E. Holzbecher [1], A. Hadidi [1]
[1] German University of Technology in Oman, Muscat, Oman

Analytical Solution for the Steady Poroelastic State under Influence of Gravity

E. Holzbecher [1]
[1] German University of Technology in Oman, Muscat, Oman

Sensitivity Analysis of CPP's for Solvent Removal Process of a API-Protein Bonded Nano-Suspension

C. C. Huang [1], T. Liu [1], F. Faassen [1]
[1] Teva Pharmachemie B.V., Haarlem, The Netherlands

Computational Study on Transcutaneous Frontal Nerve Stimulation: Simplification of Human Head Model

E. Salkim [1], A. N. Shiraz [1], A. Demosthenous [1]
[1] Electronic and Electrical Department, University College London, London, UK

Modeling and Analysis of Aberrations in Electron Beam Melting (EBM) Systems

D. Svensson [1], A. Azhirnian [2]
[1] Arcam AB, Mölndal, Sweden
[2] Chalmers University of Technology, Gothenburg, Sweden

Analysis of Electromagnetic Behavior of Permanent Magnetized Electrical Machines in Fault Modes

M. U. Hassan [1], R. Nilssen [1], A. Røkke [2]
[1] Department of Electrical Power Engineering, NTNU, Trondheim, Norway
[2] Rolls Royce Marine AS, Trondheim, Norway
[2] Chalmers University of Technology, Gothenburg, Sweden

Simulation of an Impulse Arc Discharge in Line Lightning Protection Devices

A. Chusov [1], E. Rodikova [2], D. Belko [1]
[1] Streamer Electric Inc., Saint Petersburg, Russia
[2] Streamer Electric Inc. and Saint Petersburg State University, St. Petersburg, Russia

Simulation of Dynamic Thermal Fields Assisting DMLS Additive Manufacturing of Biocompatible Ti-Alloy

E. Lacatus [1], G. C. Alecu [2], M. Sopronyi [3]
[1] Polytechnic University of Bucharest, Bucharest, Romania

Approximation of the Flow Field in Electrochemical Machining Incorporating Pressure Drop Calculation

R. Paul [1], M. Zinecker [1], M. Hackert-Oschätzchen [1], A. Schubert [1]
[1] Professorship Micromanufacturing Technology, Chemnitz University of Technology, Chemnitz, Germany

Multiscale Model of the PECM with Oscillating Cathode for External Geometries Using a Virtual Switch

I. Schaarschmidt [1], M. Zinecker [1], M. Hackert-Oschätzchen [1], A. Schubert [1], G. Meichsner [2]
[1] Professorship Micromanufacturing Technology, Chemnitz University of Technology, Chemnitz, Germany
[2] Fraunhofer Institute for Machine Tools and Forming Technology, Chemnitz, Germany

Copper Electrochemical Polishing Optimisation

A. Pérez Rodríguez [1], L. Marques Antunes Ferreira [1]
[1] CERN, Geneva, Switzerland

A Multiphysics Model to Ensure Power Cables are Restrained Safely During Short Circuit Fault

M. S. Yeoman [1], R. J. Varley [1], R. Damodharan [1], L. Frizzell [2]
[1] Continuum Blue Ltd., Cardiff, United Kingdom
[2] CMP Products Ltd., Cramlington, United Kingdom

Hydrothemal Carbonization: A Renewable Alternative to Fossil Fuels and Respective Evaluation

P. Kladisios [1], A. Stegou [1], Z. Sagia [1]
[1] National Technical University of Athens, Athens, Greece.

Simulation and Design of Lithium Ion Battery Packs for the Altitude Conditions in Northern Chile

A. Mallco Carpio [1], M. Cortes Carmona [1]
[1] University of Antofagasta, Antofagasta Energy Center, Antofagasta, Chile

Multiphysics Simulation of Micro-Thermoelectric Generators Based on Power Factor Optimized Materials

V. Barati [1], H. Reith [1], G. Li [1], D. A. Lara Ramos [1], G. Schierning [1], K. Nielsch [1]
[1] Leibniz Institute for Solid State and Material Research, Dresden, Germany

Inverse Analysis of Soil Parameters Based on Deformation of a Bank Protection Structure

Y. Xing [1], R. Hu [2], Q. Liu [1]
[1] Geoscience Centre, University of Goettingen, Goettingen, Germany
[2] School of Earth Science and Engineering, Hohai University, Nanjing, China

Simulation of Heat and Mass Transfer During Artificial Ground Freezing in Saturated Saline Groundwater

Q. Liu [1], R. Hu [2]
[1] Geoscience Centre, University of Goettingen, Goettingen, Germany
[2] School of Earth Science and Engineering, Hohai University, Nanjing, China

Comparison of Pipe Flow vs. CFD Module for Homogeneous Liquid Delivery to a Tank in a Cooling Reactor

L. Leis [1], D. Kray [1]
[1] Institute for Energy System Technology INES, University of Applied Sciences, Offenburg, Germany

Modal Analysis of Rotating Machines

C. Frankrone [1], L. Fromme [1]
[1] Department of Engineering Sciences and Mathematics, Bielefeld University of Applied Sciences, Bielefeld, Germany

COMSOL Multiphysics® Simulation of Functionalized 3D Biocompatible Porous Graphene Composites

E. Lacatus [1]
[1] Polytechnic University of Bucharest (UPB), Bucharest, Romania

Comparison Between COMSOL Multiphysics® and Star-CCM+® Simulation Results and Experimentally Determined Measured Data for a Venturi Tube

E. Weizel [1], A. Diring [1], L. Fromme [1], M. Petry [1]
[1] University of Applied Sciences, Department of Engineering Sciences and Mathematics, Bielefeld, Germany

Uncertainty Assessment and Sensitivity Analysis of Heat Generation within a Lithium-Ion Battery

G. Liebig [1], G. Gupta [1], K. Derendorf [1], C. Agert [1]
[1] DLR Institute of Networked Energy Systems, Oldenburg, Germany

Modeling of Epithelial Sheet Deformation Under External Force Applied by a Migrating Cell

M. A. Akhmanova [1], A. Ratheesh [1], D. E. Siekhaus [1]
[1] Institute of Science and Technology Austria, Klosterneuburg, Austria

Optical Monitoring Method of Sessile Droplet Evaporation

V. Tishkova [1], R. Grossier [1], S. Veesler [1]
[1] Aix Marseille Univ, CNRS, Centre Interdisciplinaire de Nanoscience de Marseille (CINaM), Marseille, France

Modeling of Electro-Thermal Microbolometer for Thermal Imaging

A. Nowicki [1], A. Bennecer [1]
[1] Mechanical Engineering, University of Northampton & Gdańsk University of Technology, Gdańsk, Poland
[2] Engineering, University of Northampton, Northampton, United Kingdom

Towards a Quantitative Prediction of Ice Forming at the Surface of Airport Runways

J. D. Wheeler [1], P. Namy [1], M. Rosa [1], L. Capobianco [1]
[1] SIMTEC, Grenoble, France

Evaluating Nanogaps in Ag and Au Nanoparticle Clusters for SERS Applications Using COMSOL Multiphysics®

R. Asapu [1], R. Ciocarlan [2], N. Claes [3], N. Blommaerts [1], S. Bals [3], P. Cool [2], S. Denys [1], S. Lenaerts [1], S. W. Verbruggen [1]
[1] Department of Bioscience Engineering, DuEL Research Group, University of Antwerp, Belgium
[2] Department of Chemistry, PLASMANT Research Group, University of Antwerp, Belgium

Gas Permeation Through the Polymeric Membrane – Fluid Behavior in the Permeate Channel

M. Szwast [1]
[1] Department of Chemical and Process Engineering, Warsaw University of Technology, Warsaw, Poland
[3] Department of Physics, EMAT Research Group, University of Antwerp, Belgium

Exergy Analysis of Polymer Flooding in Clastic Reservoirs

A. Hassan [1], H. Bruining [2], T. Musa [3], R. Farajzadeh [2]
[1] Delft University of Technology, Delft, The Netherlands, and Sudan University of Science and Technology, Khartoum, Sudan
[2] Delft University of Technology, Delft, The Netherlands
[3] Sudan University of Science and Technology, Khartoum, Sudan

Computational Fluid Dynamics Approach to Evaluate Electrostatic Precipitator Performance

M. Ahmadi [1]
[1] Faculty of Engineering Technology, University of Twente, Enschede, The Netherlands

FEM Modeling of a 3D Carbon Fiber Pylon

B. Chiné [1], I. López [1], J. León [1]
[1] Costa Rica Institute of Technology, School of Materials Science and Engineering, Cartago, Costa Rica

Urban Air Purification Using Semi-Active Photocatalysis

M. Boumahdi [1], J. Roegiers [2], C. El Amrani [1], S. Denys [2]
[1] Department of Computer Engineering, Abdelmalek Essaadi University, Tangier, Morocco
[2] Sustainable Energy, Air & Water Technology, Department of Bioscience Engineering, University of Antwerp, Antwerp, Belgium

COMSOL® Simulation of Blister Actuated Laser Induced Forward Transfer (Ba-LIFT)

M. Morales [1], J. J. Moreno [1], D. Munoz-Martin [1], C. Molpeceres [1]
[1] Centro Láser UPM, Universidad Politécnica de Madrid, Madrid, Spain

Stress Analysis of Buried Pipes using COMSOL Multiphysics® Software

A. Mohamed [1], A. El-Hamalawi [1], M. Frost [1], A. Connell [2]
[1] Loughborough University, Loughborough, United Kingdom
[2] DNV GL, Loughborough, United Kingdom

CFD Analysis of a Stirred Vessel Bioreactor with Double Pitch Blade and Rushton Type Impellers

A. Buss [1,2], A. Suleiko [2,3], K. Rugele [2], J. Vanags [3]
[1] Riga Biomaterials Innovation and Development Centre, Riga Technical University, Riga, Latvia
[2] Institute of General Chemical Engineering, Riga Technical University, Riga, Latvia
[3] Latvian State Institute of Wood Chemistry, Laboratory of Bioprocess Engineering, Riga, Latvia

Designing and Implementation of a 4000/5A Current Transformer

O. Ozgonenel [1], S. Eyup [2], U. Kurt [3]
[1] Electrical and Electronic Engineering, Ondokuz Mayis University, Samsun, Turkey
[2] Unitrans Co., Istanbul, Turkey
[3] Electrical and Electronic Engineering, Amasya University, Amasya, Turkey

Modeling of the Transient Thermal Response in Solids for Application to IR-PTR

J. Hernández Wong [1], J. B. Rojas [2], J. A. Calderon Arenas [2], E. Marin Moares [2], V. Suarez Quezada [3], L. Olivo Arias [2]
[1] Catedrás CONACyT-Instituto Politécnico Nacional, Centro de Investigación en Ciencia Aplicada y Tecnología Avanzada, Mexico City, Mexico
[2] Instituto Politécnico Nacional, Centro de Investigación en Ciencia Aplicada y Tecnología Avanzada, Mexico City, Mexico
[3] Catedrás CONACyT-Universidad Autónoma Metropolitana, Iztapalapa, Mexico

Effects of Geometry and Operating Conditions on Membrane Reactor for Water Gas Shift Reaction

D. Shin [1], T. Kim [1], J. Lee [1]
[1] Altsoft Inc., Seoul, South Korea

Modeling Fluid-Structure Interaction in a Pressure-Controlled Current-Limiting Valve

N. Mügge [1], A. Waschke [1], L. Fromme [1], M. Petry [1]
[1] Bielefeld University of Applied Sciences, Department of Engineering Sciences and Mathematics, Bielefeld, Germany

CFD Modeling of a Mixture Device for Medical Applications

J. Sandkühler [1]
[1] UAS Augsburg, Augsburg, BY, Germany

Two-Dimensional Numerical Simulation of a Planar Radio-Frequency Atmospheric Pressure Plasma Source

L. Wang [1], G. Dinescu [2], E.- R. Ionita [2], C. Leys [1], A. Y. Nikiforov [1]
[1] Department of Applied Physics, Ghent University, Ghent, Belgium
[2] National Institute of Laser, Plasma and Radiation, Măgurele, Romania

Simulation of Phononic Cavity Coupling in Nanobeam Based Structures Using COMSOL Multiphysics®

A.V. Korovin [1], Y. Pennec [1], B. Djafari-Rouhani [1]
[1] Institut d'Electronique, de Micro-électronique et de Nanotechnologie, UMR CNRS 8520, Cité Scientifique, 59652 Villeneuve d'Ascq Cedex, France

Optimal Bang-Bang Control in Coupled Dynamical Systems

E. Gehrig [1]
[1] Hochschule RheinMain University of Applied Sciences, Wiesbaden Rüsselsheim, Germany

Fatigue Analysis of an Aluminum Tricycle Frame

B. Chiné [1], A. Rodríguez [1], J. A. Ramírez [1]
[1] Costa Rica Institute of Technology, School of Materials Science and Engineering, Cartago, Costa Rica

Electromagnetic and Thermal Modeling of Microwave Furnaces

N. Rezaii [1], R. Chuman [1], J.-Ph. Mai [1]
[1] JPM Silicon GmbH / Technical University of Braunschweig, Braunschweig, Germany

Polynomial-Chaos Uncertainty Modeling in Eddy-Current Inspection of Cracks

T. T. Zygiridis [1], A. E. Kyrgiazoglou [2], T. P. Theodoulidis [2]
[1] Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Kozani, Greece
[2] Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece

A Fluid Particle Simulation to Study the Motion Sickness in Semicircular Canal

C. Park [1], J. Lee [1]
[1] Altsoft Inc., Seoul, South Korea

3D-model of an AC/DC Hybrid EHV Transmission Line to Analyze the Electrical Field along Insulators

D. Potkrajac [1], S. Papenheim [1], M. Kizilcay [1]
[1] University of Siegen, Siegen, Germany

Keep it Simple and Learn More - On a Stationary Study of a Time-Dependent Problem

B. Baumann [1], J. Schwieger [1,2], U. Stein [1], M. Wolff [1]
[1] Hamburg University of Applied Sciences, Hamburg, Germany

Computational Modeling of Electrode with Saline Irrigation for Radiofrequency Cardiac Ablation

J. H. Moon [1], J. W. Ahn [1], Y. J. Kim [1], S. A. Lee [1], H. C. Jung [1], S. H. Lee [1]
[1] Osong medical innovation foundation, medical device development center, Cheongju-Si, South Korea

3D Simulation of an Ethanol Reformer

A. Cifuentes [1], J. Llorca [1], R. Torres [1], S. Rosell [1], J. Grau [1]
[1] Universitat Politècnica de Catalunya, Barcelona, Catalonia, Spain

Analysis of Mixing Chambers for the Processing of Two-Component Adhesives for Transport Applications

P. Steinert [1], R. Paul [1], I. Schaarschmidt [1], M. Zinecker [1], M. Hackert-Oschätzchen [1], Th. Muschalek [2], J. Esslinger [2], A. Schubert [1]
[1] Professorship Micromanufacturing Technology, Chemnitz University of Technology, Chemnitz, Germany
[2] Rublic+Canzler GmbH, Dresden, Germany

Design and Optimization of Power Cable Accessories Using COMSOL Multiphysics®

A. Lewarkar [1], D. Bergsma [1], S. Madhar [2]
[1] E&D Department, Lovink Enertech B.V., Terborg, Netherlands
[2] Electrical Engineering Department, Delft University of Technology, Delft, Netherlands

Separation of Circulating Tumor Cells Using Insulating Based Dielectrophoresis

M. Rezayati Charan [1]
[1] Department of Mechanical Engineering, Eindhoven University of Technology, Eindhoven, Netherlands

Lithosphere-Scale 3D Thermal Models of the Norwegian Continental Shelf

Y. P. Maystrenko [1]
[1] Geological Survey of Norway (NGU), Trondheim, Norway

Transient Vacuum and High Pressure Generation by Focused Acoustic Waves

R. Eisenschmid [1]
[1] OPTIMA pharma GmbH, Schwaebisch Hall, Germany

CFD Investigation of a Photocatalytic Multi-Tube Reactor for Indoor Air Purification

J. van Walsem [1], J. Roegiers [1], S. Lenaerts [1], S. Denys [1]
[1] Department of Bioscience Engineering, University of Antwerp, Antwerp, Belgium

Simulation of the Additive Process of Forming 3D Products from HSLA Steel 09G2S

V. A. Kostin [1], G. M. Grygorenko [1]
[1] Department of Materials Science, E. O. Paton Electric Welding Institute, Kiev, Ukraine

Simulation of Auxin Accumulation and Transport in a Plant Root

M. A. Akhmanova [1], M. Fendrych [1], J. Friml [1]
[1] Institute of Science and Technology Austria, Klosterneuburg, Austria