

## Openfoam User Guide

*Containing the proceedings of the 11th International Conference on Advances in Fluid Mechanics held in Ancona Italy, AFM 2016 followed the success of previous global conferences in the series, the first of which took place in 1996. The success of the conference continues to attract high quality contributions that present original findings and results. The field of fluid mechanics is extensive and has numerous and varied applications. Emphasis within the book is placed on new applications and research currently in progress. A key purpose is to provide a forum for discussing new work in fluid mechanics and, in particular, for promoting the interchange of new ideas and the presentation on the latest applications in the field. The conference covers a wide range of topics such as: Computational methods; Hydrodynamics; Fluid structure interaction; Bio-fluids; Flow in electronic devices; Environmental fluid mechanics; Heat and mass transfer; Industrial applications; Energy systems; Nano and micro fluids; Turbulent flow Jets Fluidics; Droplet and spray dynamics; Bubble dynamics; Multiphase fluid flow; Aerodynamics and gas dynamics; Pumping and fluid transportation and Experimental measurements.*

*This book contains the refereed proceedings of the Cybernetics Perspectives in Systems session of the 11th Computer Science Online Conference 2022 (CSOC 2022), which was held in April 2022 online. Papers on modern cybernetics and informatics in the context of networks and systems are an important component of current research issues. This volume contains an overview of recent method, algorithms and designs.*

*The volume reports on interdisciplinary discussions and interactions between theoretical research and practical studies on geometric structures and their applications in architecture, the arts, design, education, engineering, and mathematics. These related fields of research can enrich each other and renew their mutual interest in these topics through networks of shared inspiration, and can ultimately enhance the quality of geometry and graphics education. Particular attention is dedicated to the contributions that women have made to the scientific community and especially mathematics. The book introduces engineers, architects and designers interested in computer applications, graphics and geometry to the latest advances in the field, with a particular focus on science, the arts and mathematics education.*

*This second edition of Concentrating Solar Power Technology edited by Keith Lovegrove and Wes Stein presents a fully updated comprehensive review of the latest technologies and knowledge, from the fundamental science to systems design, development, and applications. Part one introduces the fundamental principles of CSP systems, including site selection and feasibility analysis, alongside socio-economic and environmental assessments. Part two focuses on technologies including linear Fresnel reflector technology, parabolic-trough, central tower, and parabolic dish CSP systems, and concentrating photovoltaic systems. Thermal energy storage, hybridization with fossil fuel power plants, and the long-term market potential of CSP technology are also explored. Part three goes on to discuss optimization, improvements, and applications, such as absorber materials for solar thermal receivers, design optimization through integrated techno-economic modelling, and heliostat size optimization. With its distinguished editors and international team of expert contributors, Concentrating Solar Power Technology, 2nd Edition is an essential guide for all those involved or interested in the design, production, development, optimization, and application of CSP*

**technology, including renewable energy engineers and consultants, environmental governmental departments, solar thermal equipment manufacturers, researchers, and academics. Provides a comprehensive review of concentrating solar power (CSP) technology, from the fundamental science to systems design, development and applications Reviews fundamental principles of CSP systems, including site selection and feasibility analysis and socio-economic and environmental assessments Includes an overview of the key technologies of parabolic-trough, central tower linear Fresnel reflector, and parabolic dish CSP systems, and concentrating photovoltaic systems**

**II Edition**

**Cybernetics Perspectives in Systems**

**Object, Models, Components, Patterns**

**Innovative Food Processing Technologies**

**Proceedings of the 5th International and 41st National Conference on FMFP 2014**

No pyrometallurgical smelter can operate without some form of tapping system. It is the one thing all smelters have in common. This collection discusses this meeting point of the science, technology, and skill involved in this process. The tap-hole design process includes a set of design criteria, which need to be revised as the results of laboratory, computational fluid dynamics (CFD), and time-and-motion studies become available. The tap-hole life cycle is considered in this volume, with authors addressing the requirements for installation and operability as well as for maintenance. Matters such as online monitoring of the tap-hole wear, handling of liquid products, and extraction of fumes are all discussed. Although much has been done to make the tapping process as automatic as possible, tapping of smelters cannot be done without labor. Tap floor operators work in harsh environments where safety is of utmost importance. Selection of suitable personnel and intensive training is required and is discussed in this collection.

Wineries are facing new challenges due to actual market demands for the creation of products exhibiting more particular flavors. In addition, climate change has led to the requirement for grape varieties with specific features, such as convenient maturation times, enhanced tolerance towards dryness, osmotic stress, and resistance against plant-pathogens. The next generation of yeast starter cultures should produce wines with an appealing sensory profile and less alcohol. This Special Issue comprises actual studies addressing some of the problems and solutions for the environmental, technical, and consumer challenges of wine making today: Development of sophisticated mass spectroscopic methods enable the identification of the major metabolite spectrum of grapes/wine and deliver detailed insights in terroir and yeast-specific traits; Knowledge of the origin and reactions of reductive sulphur compounds facilitates the avoidance of unpleasant wine odors; Innovative physical – chemical treatments support effective and sustainable color extraction from red grape varieties; Enological enzymes from yeasts used directly or in the form of starter cultures are promising tools to increase the juice yields, color intensity, and aroma of wine; Natural and artificial *Saccharomyces* hybrids as well as collections of adapted wild isolates from various ecological niches will extend winemakers repertoire, allowing individual fermentations; Exact process control of wine fermentations by convenient computer programs will guarantee consistently high product quality.

Numerical and experimental investigations of distribution of gaseous emissions with the air flow in the indoor environment Logos Verlag Berlin

GmbH

This book constitutes the refereed proceedings of the 25th International Conference on Parallel Computational Fluid Dynamics, ParCFD 2013, held in Changsha, China, in May 2013. The 35 revised full papers presented were carefully reviewed and selected from more than 240 submissions. The papers address issues such as parallel algorithms, developments in software tools and environments, unstructured adaptive mesh applications, industrial applications, atmospheric and oceanic global simulation, interdisciplinary applications and evaluation of computer architectures and software environments.

MRAE-2016

Wine Fermentation

Geomechanics from Micro to Macro

SimHydro 2017 - Choosing The Right Model in Applied Hydraulics

Computational Fluid Dynamics for Wind Engineering

Concentrating Solar Power Technology

Modern Fluid Dynamics, Second Edition provides up-to-date coverage of intermediate and advanced fluids topics. The text emphasizes fundamentals and applications, supported by worked examples and case studies. Scale analysis, non-Newtonian fluid flow, surface coating, convection heat transfer, lubrication, fluid-particle dynamics, microfluidics, entropy generation, and fluid-structure interactions are among the topics covered. Part A presents fluids principles, and prepares readers for the applications of fluid dynamics covered in Part B, which includes computer simulations and project writing. A review of the engineering math needed for fluid dynamics is included in an appendix.

Containing papers from the 2nd High Performance Design of Structures and Materials and the Optimum Design of Structures conference, following the success of a number of meetings since 1989, this book will be of interest to those in any engineering field. The use of novel materials and new structural concepts nowadays is not restricted to highly technical areas like aerospace, aeronautical applications or the automotive industry, but affects all engineering fields including those such as civil engineering and architecture. Most high performance structures require the development of a generation of new higher performance sustainable materials, which can more easily resist a range of external stimuli or react in a non-conventional manner. Emphasis is placed on intelligent structures and materials as well as the application of computational methods for their

modelling, control and management. Optimisation problems of interest involve those related to size, shape and topology of structures and materials. Optimisation techniques have much to offer to those involved in the design of new industrial products. The development of new algorithms and the appearance of powerful commercial computer codes with easy to use graphical interfaces have created a fertile field for the incorporation of optimisation into the design process in all engineering disciplines. The book addresses the topic of design optimisation with welcomed contributions on numerical methods, different optimisation techniques and new software. Several of the topics covered are: Composite materials and structures; Material characterisation; Experiments and numerical analysis; Transformable structures; Environmentally friendly and sustainable structures; Evolutionary methods in optimisation; Aerospace structures; Biomechanics application and Pneumatic structures.

The TransNav 2013 Symposium held at the Gdynia Maritime University, Poland in June 2013 has brought together a wide range of participants from all over the world. The program has offered a variety of contributions, allowing to look at many aspects of the navigational safety from various different points of view. Topics presente

A comprehensive text covering all aspects of wave and tidal energy Wave and Tidal Energy provides a comprehensive and self-contained review of the developing marine renewable energy sector, drawing from the latest research and from the experience of device testing. The book has a twofold objective: to provide an overview of wave and tidal energy suitable for newcomers to the field and to serve as a reference text for advanced study and practice. Including detail on key issues such as resource characterisation, wave and tidal technology, power systems, numerical and physical modelling, environmental impact and policy. The book also includes an up-to-date review of developments worldwide and case studies of selected projects. Key features: A comprehensive and self-contained text covering all aspects of the multidisciplinary fields of wave and tidal energy. Draws upon the latest research in wave and tidal energy and the experience of leading practitioners in numerical and laboratory modelling. Regional developments worldwide are reviewed and representative projects are presented as case studies. Wave and Tidal Energy

is an invaluable resource to a wide range of readers, from engineering students to technical managers and policymakers to postgraduate students and researchers.

Marine Navigation and Safety of Sea Transportation

ISSW30 - Volume 2

Proceedings of the Fifth International Conference in Ocean Engineering (ICOE2019)

Proceedings of the Eighth International Conference on Management Science and Engineering Management

Reverse and Forward Osmosis: Principles, Applications, Advances

Environment, Energy and Sustainable Development

***Current Trends and Future Developments on (Bio-) Membranes: Reverse and Forward Osmosis: Principles, Applications, Advances covers the important aspects of RO, FO and their combination in integrated systems, along with their specific and well-established applications. The book offers an overview of recent developments in the field of forward and reverse osmosis and their applications in water desalination, wastewater treatment, power generation and food processing. General principles, membrane module developments, membrane fouling, modeling, simulation and optimization of both technologies are also covered. The book's ultimate goal is to support the scientific community, professionals and enterprises that aspire to develop new applications. Provides an overview of the advances made in combining reverse osmosis membrane technology and the corresponding forward osmosis Provides a comprehensive review of advanced research on membrane processes for water desalination, wastewater treatments, etc. Addresses key issues in process intensification and extraction of energy from renewable sources Identifies further research needs for the practical implementation of these two membrane technologies Fiber-reinforced materials offer a huge potential for lightweight design of load-bearing structures. However, high-volume production of such parts is still a challenge in terms of cost efficiency and competitiveness. Numerical process simulation can be used to analyze underlying mechanisms and to find a suitable process design. In this study, the curing process of the resin is investigated with regard to its influence on RTM mold filling and process-induced distortion.***

***This is the Proceedings of the Eighth International Conference on Management Science and Engineering Management (ICMSEM) held from July 25 to 27, 2014 at Universidade Nova de Lisboa, Lisbon, Portugal and organized by International Society of Management Science and Engineering Management (ISMSEM), Sichuan University (Chengdu, China) and Universidade Nova de Lisboa (Lisbon, Portugal). The goals of the conference are to foster international research collaborations in Management Science and Engineering Management as well as to provide a forum to present current findings. A total number of 138 papers from 14 countries are selected for the proceedings by the conference scientific committee through rigorous referee review. The selected papers in the second volume are focused on Computing and Engineering Management covering areas of Computing Methodology, Project Management, Industrial Engineering and Information Technology.***

***COMPUTATIONAL FLUID DYNAMICS FOR WIND ENGINEERING An intuitive and comprehensive exploration of computational fluid dynamics in the study of wind engineering Computational Fluid Dynamics for Wind Engineering provides readers with a detailed overview of the use of computational fluid dynamics (CFD) in understanding wind loading on structures, a problem becoming more pronounced as urban density increases and buildings become larger. The work emphasizes the application of CFD to practical problems in wind loading and helps readers understand important associated factors such as turbulent flow around buildings and bridges. The author, with extensive research experience in this and related fields, offers relevant and engaging practice material to help readers learn and retain the concepts discussed, and each chapter includes accessible summaries at the end. In addition, the use of the OpenFOAM tool—an open-source wind engineering application—is explored.***

***Computational Fluid Dynamics for Wind Engineering covers topics such as: Fluid mechanics, turbulence in fluid mechanics, turbulence modelling, and mathematical modelling of wind engineering problems The finite difference method for CFD, solutions to the incompressible Navier-Stokes equations, visualization, and animation in CFD, and the application of CFD to building and bridge aerodynamics How to compare CFD analysis with wind tunnel measurements, field measurements, and the ASCE-7 pressure coefficients Wind effects and strain on large structures Providing comprehensive coverage of how CFD can explain wind***

**load on structures along with helpful examples of practical applications, Computational Fluid Dynamics for Wind Engineering serves as an invaluable resource for senior undergraduate students, graduate students, researchers and practitioners of civil and structural engineering. Numerical prediction of curing and process-induced distortion of composite structures Proceedings of First International Conference on Emerging Trends in Mechanical Engineering High Performance Computing in Science and Engineering '16 Wave and Tidal Energy Studies in Musical Acoustics and Psychoacoustics Faces of Geometry**

This book combines essential finite element (FE) theory with a set of fourteen tutorials using relatively easy-to-use FE and other numerical analysis codes so a student can undertake practical analysis and self-study. The theory covers the finite element method. Formulation of element stiffness for one dimensional bar and beam, two dimensional and three dimensional continuum elements, plate and shell elements are derived based on energy and variational methods. Linear and transient dynamic solution methods are covered for both mechanical and field analysis problems with a focus on structural analysis. Other important theoretical topics covered include element integration, element assembly, loads, boundary conditions, and a chapter devoted to material laws on elasticity, hyperelasticity and plasticity. A brief introduction to Computational Fluid Dynamics (CFD) is also included. The second half of this book presents a chapter on using tutorials containing information on how to use (on Windows) and getting started, and general hints on meshing, modelling and analysis. This is then followed by tutorial exercises that cover linear, nonlinear and dynamic mechanical analysis, steady state and transient heat analysis, field analysis, fatigue, buckling and frequency analysis, a hydraulic pipe network analysis, and lastly two tutorials on CFD simulation. Theory is linked with application and exercises are included for further self-study. For these tutorials open source codes CalculiX, FreeMAT and OpenFOAM are used. CalculiX is a comprehensive FE package covering linear, nonlinear and transient analysis. One particular benefit is that its format and structure is based on Abaqus, so knowledge gained is relevant to commercial code. FreeCAD is primarily a powerful CAD modelling code, that includes good finite element meshing and analysis capabilities and is fully integrated with CalculiX. FreeMAT is used in three tutorials for numerical analysis demonstrating algorithms for explicit finite element and CFD analysis. And OpenFOAM is used for other CFD flow simulations. The purpose of this book is to provide a unified text covering theory and practice, so a student can learn and experiment with these powerful analysis methods. It should be of value to both finite element courses and for student self-study.

This book constitutes the proceedings of the 17th International Conference on Algorithms and Architectures for Parallel Computing

ICA3PP 2017, held in Helsinki, Finland, in August 2017. The 25 full papers presented were carefully reviewed and selected from numerous submissions. They cover topics such as parallel and distributed architectures; software systems and programming models for distributed and network-based computing; big data and its applications; parallel and distributed algorithms; applications of parallel and distributed computing; service dependability and security in distributed and parallel systems; service dependability and security in distributed and parallel systems; performance modeling and evaluation. This volume also includes 41 papers of four workshops, namely: the 4th International Workshop on Data, Text, Web, and Social Network Mining (DTWSM 2017), the 5th International Workshop on Parallelism in Bioinformatics (PBio 2017), the First International Workshop on Distributed Autonomous Systems for Smart City (DACSC 2017), and the Second International Workshop on Ultrascale Computing for Early Researchers (UICER 2017). This book presents the state-of-the-art in supercomputer simulation. It includes the latest findings from leading research groups and systems from the High Performance Computing Center Stuttgart (HLRS) in 2016. The reports cover all fields of computer science and engineering ranging from CFD to computational physics and from chemistry to computer science with a particular emphasis on industrially relevant applications. Presenting findings of one of Europe's leading systems, this volume covers a wide variety of applications that deliver a high level of sustained performance. The book covers the main methods in high-performance computing. Its outstanding results in achieving the best performance for production codes are of particular interest to researchers and engineers. The book comes with a wealth of color illustrations and tables of results.

The future of music archiving and search engines lies in deep learning and big data. Music information retrieval algorithms automatically analyze musical features like timbre, melody, rhythm or musical form, and artificial intelligence then searches for these features. At the first International Symposium on Computational Ethnomusicological Archiving held on November 15-17, 2013 at the Institute of Systematic Musicology in Hamburg, Germany, a new Computational Phonogram Archiving standard was developed as an interdisciplinary approach. Ethnomusicologists, music and computer scientists, systematic musicologists as well as archivists, composers and musicians presented tools, methods and platforms and shared fieldwork and archiving experiences in the fields of musical acoustics, informatics, music theory as well as on music storage, reproduction and metadata. The Computational Phonogram Archiving standard is also in high demand in the music market as a search engine for music consumers. This book provides a comprehensive overview of the field written by leading researchers around the globe.

An Advanced Introduction with OpenFOAM® and Matlab

Principles, Developments, and Applications

Findings and Best Practice Collected During UMRIDA, a Collaborative Research Project (2013–2016) Funded by the European Union

30th International Symposium on Shock Waves 2

### Foreign Object Debris and Damage in Aviation

Furnace Tapping 2022

Foreign Object Debris and Damage in Aviation discusses both biological and non-biological Foreign Object Debris (FOD) and associated Foreign Object Damage (FOD) in aviation. The book provides a comprehensive treatment of the wide spectrum of FOD with numerous cost, management, and wildlife considerations. Management control for the debris begins at the aircraft design phase, and the book includes numerical analyses for estimating damage caused by strikes. The book explores aircraft operation in adverse weather conditions and inanimate FOD management programs for airports, airlines, airframe, and engine manufacturers. It focuses on the sources of FOD, the categories of damage caused by FOD, and both the direct and indirect costs caused by FOD. In addition, the book provides management plans for wildlife, including positive and passive methods. The book will interest aviation industry personnel, aircraft transport and ground operators, aircraft pilots, and aerospace or aviation engineers. Readers will learn to manage FOD to guarantee air traffic safety with minimum costs to airlines and airports.

Computational fluid dynamics (CFD), which uses numerical analysis to predict and model complex flow behaviors and transport processes, has become a mainstream tool in engineering process research and development. Complex chemical processes often involve coupling between dynamics at vastly different length and time scales, as well as coupling of different physical models. The multiscale and multiphysics nature of those problems calls for delicate modeling approaches. This book showcases recent contributions in this field, from the development of modeling methodology to its application in supporting the design, development, and optimization of engineering processes. This book covers cutting-edge findings related to uncertainty quantification and optimization under uncertainties (i.e. robust and reliable optimization), with a special emphasis on aeronautics and turbomachinery, although not limited to these fields. It describes new methods for uncertainty quantification, such as non-intrusive polynomial chaos, collocation methods, perturbation methods, as well as adjoint based and multi-level Monte Carlo methods. It includes methods for characterization of most influential uncertainties, as well as formulations for robust and reliable design optimization. A distinctive element of the book is the unique collection of test cases with prescribed uncertainties, which are representative of the current engineering practice of the industrial consortium partners involved in UMRIDA, a level 1 collaborative project within the European Commission's Seventh Framework Programme (FP7). All developed methods are benchmarked against these industrial challenges. Moreover, the book includes a section dedicated to Best Practice Guidelines for uncertainty quantification and robust design optimization, summarizing the findings obtained by the consortium members within the UMRIDA project. All in all, the book offers a authoritative guide to

cutting-edge methodologies for uncertainty management in engineering design, covers a wide range of applications and discusses new ideas for future research and interdisciplinary collaborations.

This book includes high-quality research papers presenting the latest advances in aerospace and related engineering fields. The papers are organized according to six broad areas (i) Aerospace Propulsion, (ii) Space Research, Avionics and Instrumentation, (iii) Aerodynamics Wind Tunnel and Computational fluid dynamics (CFD), (iv) Structural Analysis and Finite Element Method (FEM), (v) Materials, Manufacturing and Air Safety and (vi) Aircraft Environmental and Control System and Stability, making it easy for readers to find the information they require. Offering insights into the state of the art in aerospace engineering, the original research presented is valuable to academics, researchers, undergraduate and postgraduate students as well as professionals in industry and R&D. The clearly written book can be used for the validation of data, and the development of experimental and simulation techniques as well as other mathematical approaches.

50th International Conference, TOOLS Europe 2012, Prague, Czech Republic, May 29-31, 2012, Proceedings

Proceedings of the International Conference on Modern Research in Aerospace Engineering

Proceedings of 11th Computer Science On-line Conference 2022, Vol. 3

Computational Phonogram Archiving

Fluid Mechanics and Fluid Power – Contemporary Research

Proceedings of the International Symposium on Plastics Technology

**This volume comprises the proceedings of the 42nd National and 5th International Conference on Fluid Mechanics and Fluid Power held at IIT Kanpur in December, 2014. The conference proceedings encapsulate the best deliberations held during the conference. The diversity of participation in the conference, from academia, industry and research laboratories reflects in the articles appearing in the volume. This contributed volume has articles from authors who have participated in the conference on thematic areas such as Fundamental Issues and Perspectives in Fluid Mechanics; Measurement Techniques and Instrumentation; Computational Fluid Dynamics; Instability, Transition and Turbulence; Turbomachinery; Multiphase Flows; Fluid-Structure Interaction and Flow-Induced Noise; Microfluidics; Bio-inspired Fluid Mechanics; Internal Combustion Engines and Gas Turbines; and Specialized Topics. The contents of this volume will prove useful to researchers from industry and academia alike.**

**There are many sources of emissions produced by burning fuel for power or heat, through chemical reactions, and from leaks from industrial processes or equipment. There is always a possibility of a potential hazard when these gases enter into the indoor environment with the air flow. The determination of the concentration profiles are necessary to evaluate the potential**

hazard posed by the gas spread. The main objectives of this work are to develop an appropriate measurement methodology and a 3D CFD transient multicomponent simulation model for the determination of spatial and temporal distribution of gaseous emissions with the air flow in the indoor environment. This work is also aimed at comparing the numerical simulation results of different CFD programs for a 2D base case model of indoor air flow with and without emission source under laminar and turbulent flow conditions for the purpose of developing a better basic understanding of the physical phenomena and for the selection of the suitable and appropriate CFD program for the further development of the simulation model. One of the goals is also to apply the developed simulation model to the loss prevention and risk mitigation in the indoor environment and to study the influence of different parameters on the concentration distribution of gaseous pollutants in the presence of air flow in the indoor environment to minimize the expensive and time consuming experimentation efforts.

Computational Optimization of Internal Combustion Engines presents the state of the art of computational models and optimization methods for internal combustion engine development using multi-dimensional computational fluid dynamics (CFD) tools and genetic algorithms. Strategies to reduce computational cost and mesh dependency are discussed, as well as regression analysis methods. Several case studies are presented in a section devoted to applications, including assessments of: spark-ignition engines, dual-fuel engines, heavy duty and light duty diesel engines. Through regression analysis, optimization results are used to explain complex interactions between engine design parameters, such as nozzle design, injection timing, swirl, exhaust gas recirculation, bore size, and piston bowl shape. Computational Optimization of Internal Combustion Engines demonstrates that the current multi-dimensional CFD tools are mature enough for practical development of internal combustion engines. It is written for researchers and designers in mechanical engineering and the automotive industry. This book gathers a collection of extended papers based on presentations given during the SimHydro 2017 conference, held in Sophia Antipolis, Nice, France on June 14–16, 2017. It focuses on how to choose the right model in applied hydraulics and considers various aspects, including the modeling and simulation of fast hydraulic transients, 3D modeling, uncertainties and multiphase flows. The book explores both limitations and performance of current models and presents the latest developments in new numerical schemes, high-performance computing, multiphysics and multiscale methods, and better interaction with field or scale model data. It gathers the latest theoretical and innovative developments in the modeling field and presents some of the most advanced applications on various water related topics like uncertainties, flood simulation and complex hydraulic applications. Given its breadth of coverage, it addresses the needs and interests of practitioners, stakeholders, researchers and engineers alike.

25th International Conference, ParCFD 2013, Changsha, China, May 20-24, 2013. Revised Selected Papers  
CFD Modeling of Complex Chemical Processes

## **A Comprehensive Review**

**17th International Conference, ICA3PP 2017, Helsinki, Finland, August 21-23, 2017, Proceedings**

### **Simulation of Turbulent Flows with and without Combustion with Emphasis on the Impact of Coherent Structures on the Turbulent Mixing**

#### **Numerical and experimental investigations of distribution of gaseous emissions with the air flow in the indoor environment**

This book comprises the proceedings of the Fifth International Conference in Ocean Engineering (ICOE2019) focusing on emerging opportunities and challenges in the field of ocean engineering and offshore structures. Some of the themes covered in this volume are offshore structures and deepwater technology, ocean optics & acoustics, ocean renewable energy, marine spatial planning, climate change impacts & disaster risk reduction, etc. The essays are written by leading international experts, making it a valuable resource for researchers and practicing engineers alike.

This textbook explores both the theoretical foundation of the Finite Volume Method (FVM) and its applications in Computational Fluid Dynamics (CFD). Readers will discover a thorough explanation of the FVM numerics and algorithms used for the simulation of incompressible and compressible fluid flows, along with a detailed examination of the components needed for the development of a collocated unstructured pressure-based CFD solver. Two particular CFD codes are explored. The first is uFVM, a three-dimensional unstructured pressure-based finite volume academic CFD code, implemented within Matlab. The second is OpenFOAM®, an open source framework used in the development of a range of CFD programs for the simulation of industrial scale flow problems. With over 220 figures, numerous examples and more than one hundred exercise on FVM numerics, programming, and applications, this textbook is suitable for use in an introductory course on the FVM, in an advanced course on numerics, and as a reference for CFD programmers and researchers.

Food process engineering, a branch of both food science and chemical engineering, has evolved over the years since its inception and still is a rapidly changing discipline. While traditionally the main objective of food process engineering was preservation and stabilization, the focus today has shifted to enhance health aspects, flavour and taste, nutrition, sustainable production, food security and also to ensure more diversity for the increasing demand of consumers. The food industry is becoming increasingly competitive and dynamic, and strives to develop high quality, freshly prepared food products. To achieve this objective, food manufacturers are today presented with a growing array of new technologies that have the potential to improve, or replace, conventional processing technologies, to deliver higher quality and better consumer targeted food products, which meet many, if not all, of the demands of the modern consumer. These new, or innovative, technologies are in various stages of development, including some still at the R&D stage, and others that have been commercialised as alternatives to conventional processing technologies. Food process engineering comprises a series of unit operations traditionally applied in the food industry. One major component of these operations relates to the application of heat, directly or indirectly, to provide foods free from pathogenic microorganisms, but also to enhance or intensify other processes, such as extraction, separation or modification of components.

The last three decades have also witnessed the advent and adaptation of several operations, processes, and techniques aimed at producing high quality foods, with minimum alteration of sensory and nutritive properties. Some of these innovative technologies have significantly reduced the thermal component in food processing, offering alternative nonthermal methods. *Food Processing Technologies: A Comprehensive Review* covers the latest advances in innovative and nonthermal processing, such as high pressure, pulsed electric fields, radiofrequency, high intensity pulsed light, ultrasound, irradiation and new hurdle technology. Each section will have an introductory article covering the basic principles and applications of each technology, and in-depth articles covering the currently available equipment (and/or the current state of development), food quality and safety, application to various sectors, food laws and regulations, consumer acceptance, advancements and future scope. It will also contain case studies and examples to illustrate state-of-the-art applications. Each section will serve as an excellent reference to food industry professionals involved in the processing of a wide range of food categories, e.g., meat, seafood, beverage, dairy, eggs, fruits and vegetable products, spices, herbs among others.

These proceedings collect the papers presented at the 30th International Symposium on Shock Waves (ISSW30), which was held in Tel-Aviv Israel from July 19 to July 24, 2015. The Symposium was organized by Ortra Ltd. The ISSW30 focused on the state of knowledge of the following areas: Nozzle Flow, Supersonic and Hypersonic Flows with Shocks, Supersonic Jets, Chemical Kinetics, Chemical Reacting Flows, Detonation, Combustion, Ignition, Shock Wave Reflection and Interaction, Shock Wave Interaction with Obstacles, Shock Wave Interaction with Porous Media, Shock Wave Interaction with Granular Media, Shock Wave Interaction with Dusty Media, Plasma, Magnetohydrodynamics, Re-entry to Earth Atmosphere, Shock Waves in Rarefied Gases, Shock Waves in Condensed Matter (Solids and Liquids), Shock Waves in Dense Gases, Shock Wave Focusing, Richtmyer-Meshkov Instability, Shock Boundary Layer Interaction, Multiphase Flow, Blast Waves, Facilities, Flow Visualization, and Numerical Methods. The two volumes serve as a reference for the participants of the ISSW30 and anyone interested in these fields.

Finite element theory and its application with open source codes

Current Trends and Future Developments on (Bio-) Membranes

Uncertainty Management for Robust Industrial Design in Aeronautics

High Performance and Optimum Design of Structures and Materials II

Electrochemical Cell Calculations with OpenFOAM

Maritime Transport & Shipping

This book comprises twelve articles which cover a range of topics from musical instrument acoustics to issues in psychoacoustic perception as well as neuromusicology. In addition to experimental methods and data acquisition, modeling (such as FEM or wave synthesis) and numerical simulation plays a central role in studies addressing sound production in musical instruments as well as the interaction of radiated sound with the environment. Some of the studies have a focus on psychoacoustic aspects in regard to

and timbre as well as apparent source width (for techniques such as stereo or ambisonics) in music production. Since musical instruments imply subjects playing instruments or singing in order to produce sound according to musical structures, this area is also covered by a study that presents an artificial intelligent agent capable to interact with a real ('analog') player in musical genres such as free jazz.

Environment, Energy and Sustainable Development brings together 242 peer-reviewed papers presented at the 2013 International Conference on Frontiers of Energy and Environment Engineering, held in Xiamen, China, November 28-29, 2013. The main objective of this proceedings set is to take the environment-energy developments discussion a step further. Volume 1

Geomechanics from Micro to Macro contains 268 papers presented at the International Symposium on Geomechanics from Micro to Macro (IS-Cambridge, UK, 1-3 September 2014). The symposium created a forum for the dissemination of new advances in the field of macro relations of geomaterial behaviour and its modelling. The papers on experimental investigations

This book constitutes the refereed proceedings of the 50th International Conference on Objects, Models, Components, Patterns Europe 2012, held in Prague, Czech Republic, during May 29-31, 2012. The 24 revised full papers presented were carefully reviewed and selected from 77 submissions. The papers discuss all aspects of object technology and related fields and demonstrate practical applications backed up by formal analysis and thorough experimental evaluation. In particular, every topic in advanced software technology is within the scope of TOOLS.

Advances in Hydroinformatics

Computational Optimization of Internal Combustion Engines

Advances in Polymer Processing 2020

Transactions of the High Performance Computing Center, Stuttgart (HLRS) 2016

Multiscale and Multiphysics Challenges

Algorithms and Architectures for Parallel Processing

This book gathers the proceedings of the International Symposium on Plastics Technology, which was held on March 10, 2020 in Aachen, Germany, and was organised by the Institute for Plastics Processing (IKV) in Industry and Craft at RWTH Aachen University. Peer-reviewed by an international scientific committee, the conference proceedings comprise the papers presented by the international speakers. Topics covered include - circular economy- extrusion- lightweight technologies- simulation and digitisation - injection moulding- hybrid materials and additive manufacturing. In these fields, key themes for plastics technologies have been identified that will shape the face of research and industry for the next decade. In their contributions, the authors present the latest scientific findings, and discuss topical issues in plastics technologies. The symposium offered an inspiring forum for the exchange on research and innovation, for discussing urgent questions and providing impulses for the future of plastics technology.

Wind turbine aerodynamics is one of the central subjects of wind turbine technology. To reduce the levelized cost of energy (LCOE), the size of a single wind turbine has been increased to 12 MW at present, with further increases expected in the near future. Big wind turbines and their associated wind farms have many advantages but also challenges. The typical effects are mainly related to the increase in Reynolds

number and blade flexibility. This Special Issue is a collection of 21 important research works addressing the aerodynamic challenges appearing in such developments. The 21 research papers cover a wide range of problems related to wind turbine aerodynamics, which includes atmospheric turbulent flow modeling, wind turbine flow modeling, wind turbine design, wind turbine control, wind farm flow modeling in complex terrain, wind turbine noise modeling, vertical axis wind turbine, and offshore wind energy. Readers from all over the globe are expected to greatly benefit from this Special Issue collection regarding their own work and the goal of enabling the technological development of new environmentally friendly and cost-effective wind energy systems in order to reach the target of 100% energy use from renewable sources, worldwide, by 2050

Modern Fluid Dynamics, Second Edition

Advances in Fluid Mechanics XI

Focused on Computing and Engineering Management

Wind Turbine Aerodynamics

Parallel Computational Fluid Dynamics

The Finite Volume Method in Computational Fluid Dynamics