DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

ANNUAL REPORT 2018

DCAMM

TECHNICAL UNIVERSITY OF DENMARK -
AALBORG UNIVERSITY - AARHUS UNIVERSITY –
UNIVERSITY OF SOUTHERN DENMARK

DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

Scientific Council as of July 2019

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FOREWORD

This annual report for the year 2018 is changed as compared to the previous years. The primary difference is that information on publications has been removed. The reason being that this information is now easily available at the homepage of the cooperating departments. The information about seminars and guests are still found in this report. Information about the seminars is extended to also include the abstract and not only the title as done previously. The purpose of the report is still mainly to serve as a reference and documentation for accomplished activities. Detailed information is available on our homepage: www.dcamm.dk and on the homepages of the cooperating departments.

This year's Annual Seminar Speaker was Professor Ken Kamrin from Massachusetts Institute of Technology. The title of the lecture was "Continuum modeling of flowing grains". The lecture was given at DTU and at AU. Furthermore, a total of 18 DCAMM seminars were held in 2018 and 8 courses were given in the auspices of DCAMM. All the details are available at the DCAMM webpage.

As of January 1st 2019, the departments cooperating in DCAMM are:

from the **Technical University of Denmark**:
DTU Civil Engineering
DTU Compute
DTU Mechanical Engineering
DTU Wind Energy

from **Aalborg University**:
Department of Civil Engineering
Department of Materials and Production
Department of Mathematical Sciences

from **Aarhus University**
Department of Engineering

from **University of Southern Denmark**
Department of Technology and Innovation

I thank all the members of DCAMM and our international contacts for their support and inspiration, and I look forward to our future continued collaboration.

Niels Leergaard Pedersen

CONTENTS

1. MEMBERS 2018

61 professors
240 scientific members
162 PhD students
} at the nine cooperating departments at the Center

28 elected members
4 foreign members

(A complete list of names is given in the Appendix).

2. FOREIGN MEMBERS

Professor John W. Hutchinson
Division of Applied Sciences
Harvard University, 315 Pierce Hall
29 Oxford St.
Cambridge, MA 02138
USA

Professor Ole Secher Madsen
Ralph M. Parsons Laboratory
Massachusetts Institute of Technology
Cambridge, MA 02139
USA

Professor Alan Needleman
Department of Materials Science & Engng.
Texas A&M University 3003
College Station
TX 77843-3003
USA

Professor S. Nemat-Nasser
Jacobs School of Engineering
University of California, San Diego
4209 Engineering Building 1
9500 Gilman Drive
La Jolla, CA 92093-0416
USA

3. GUESTS FOR EXTENDED PERIODS IN 2018
(more than a fortnight)

Guest professors & post docs:

Achiche, Sofiane, Ecole Polytechnique, Montreal, Canada, 1.8.18 – 31.8.18

Bizarre, Leticia, Unicamp – FEM, Brazil, 3.8.18 – 14.9.18

Cristinelli, Elisa, Damptech, Italy, 2.5.18 – 31.5.18

Kim, Rae Young, Yeungnam University, Korea, 15.8.18 – 15.9.18

Li, Yuzhu, University of Stavanger, Norway, 3.4.18 – 30.10.18

Mohaghegh, Kamran, Metrologic as, Denmark, 1.1218 – 31.3.20

Myers, Andrew, Northeastern University, USA, 16.6.18 – 31.12.18

Skokandic, Dominik, Zabreb University, Croatia, 5.2.18 – 23.2.18

Van Keulen, Fred, TU Delft, Netherlands, 8.5.18 – 31.8.18

Varela, Alejandro Cerda, Pontificia Universidad Católica de Valparaíso, Chile, 2.7.18 – 31.7.18

Wyller, John Andreas, Norwegian University of Life Science, Norway, 5.2.18 – 30.6.18

PhD students

Abolfathi, Shima, Shahid Chamran University of Ahvaz, Iran, 10.12.18 – 10.12.19

Afzal, Seyed Ali, University of Tehran, Iran, 20.6.18 – 20.12.18

Ba, Wei, Tsinghua University, China, 15.10.18 – 14.4.19

Beigi, Masoud, Azad University, Iran, 1.9.18 – 31.8.19

Chen, Limin, Harbi Institute of Technology, China, 1.9.18 – 31.8.19

Corso, Rosario, University Palermo, Italy, 6.9.18 – 1.11.18

Fang, Xufang, Northeastern University, China, 18.8. – 13.2.19

Filali, Oussama, LAMIH Laboratory, Valencienne University, France, 31.5.18 – 30.6.18

Giannini, Daniele, Politechnico de Milano, Italy, 10.4.18 – 28.9.18

Guangni, Zhou, China, 1.9.18 – 28.10.18

Guerra, Maria Grazia, Polytechnic of Bari, Italy, 28.8.18 – 21.9.18

Hosseniny, Seyed Aydin Raeis, Aalborg University, Denmark, 14.3.18 – 14.4.18

Imane, Bayane, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, 28.4.18 – 15.6.18

Luo, Xuan, college of Materials Science and Engineering, Chongqing University, China, 15.3.18 – 14.3.19

Lüdeker, Julian, Hamburg University of Technology, Germany, 1.9.18 – 30.11.18

Moradi, Sarvin, Sharif University, Iran, 20.9.18 – 20.3.19

Puentes, Sara Señores, Spanish Natinal Research Center for Metallurgy (CENIM), Spain, 1.3.18 – 11.6.18 and 30.9.18 – 21.12.18

Soleimani, Kaveh, Amirkabir University of Technology, Tehran Polytechnic, Iran, 9.4.18 – 30.9.18

Torezan, Vergilio, Federal University of Uberlândia, School of Mechanical Engineering, Brazil, 3.9.18 – 29.8.19

Turksezer, Zehra Irem, Politecnico di Milano, Italy, 7.9.18 – 27.10.18

Vitale, Andrea, University of Napoli, Italy, 30.5.18 – 29.6.18

Wang, Shucheng, North China Electric Power University (NCEPU), China, 17.9.18 – 2.9.19

Xiao, Yue, State Key Laboratory of Mechanical Transmission, Chongqing University, China 15.9.18 – 15.9.20

Xue, Feifei, Hohai University, China, 11.10.18 – 10.10.19

Zhang, Shiqi, Tsinghua University, China, 1.8.18 – 28.10.18

Özmen, Uğur, Manisa Celal Bayar University, Turkey, 9.7.18 – 28.9.18

4. DCAMM SEMINARS GIVEN IN 2018

Interaction of thermally stratified atmospheric boundary layers with wind turbines and wind farms

by Assistant Profess Mahdi Abkar, Dept. of Enginnering, Aarhus University, Denmark

held at DTU Mechanical Engineering 1 March 2018

Abstract:

With the thriving wind energy market all around the world, there is an increasing demand for larger, more efficient and more reliable wind farms. Wind farms extract energy from the ambient flow in the turbulent atmospheric boundary layer (ABL). Hence, optimizing the design and operations of wind farms requires a profound understanding of the mutual interaction between the ABL and wind turbines. Also, with the fast-growing number of wind farms being installed worldwide, it becomes of scientific and practical interest to quantify how the large-scale extraction of energy from the wind will affect the structure of the atmosphere and vice versa. The complexity of such flows makes it difficult to obtain all the needed information through field experiments alone and often necessitates high-resolution eddy-resolving numerical tools such as large-eddy simulation (LES). This talk primarily focuses on:

1) LES as the leading numerical technique to study the interaction between thermally stratified ABLs and wind turbines/farms
2) Improved theoretical models for prediction of heterogeneous ABL and wake flows under different atmospheric regimes (e.g.; new sub-grid-scale models for LES, new wind farm parameterizations in large-scale atmospheric models, new analytical wake modes, etc.).
3) Modeling the velocity and scalar-concentration fluctuations using the hierarchical random additive process (HRAP) formalism, which is a recently proposed interpretation of the Townsend attached eddy hypothesis.

Worth mentioning here is that power extraction from the wind can be achieved using two general types of rotary machines: horizontal-axis and vertical-axis wind turbines. In this talk, both categories are considered and discussed.

The micromorphic approach to gradient plasticity and damage

by Professor Samuel Forest, MINES ParisTech, Evry, France

held at DTU Mechanical Engineering 7 March 2018

Abstract:

A general constitutive framework is presented that encompasses a large variety of available generalized continuum theories designed for introducing material length scales into the mechanical modelling of structures and materials. In particular, it reconciles so-called micromorphic and gradient theories developed in the last fifty years and applies to the plasticity and fracture of materials. The regularization operators of such models with respect to localization phenomena are derived within the finite deformation framework. The approach is illustrated in the case of the propagation of Lüders bands in C-Mn steels under tensile and shear loading.

The method is then applied to the plasticity and fracture of single crystalline materials. Finite deformation crystal plasticity theory is enhanced to incorporate the initiation and propagation of damage with respect to crystallographic planes. The model is applicable to quasi-brittle single crystal undergoing cleavage fracture but also to ductile single crystals for which plasticity is a precursor of fracture.
The approach is illustrated by means of finite element simulations of the initiation, propagation and bifurcation / branching of cracks in single crystal nickel base superalloys under cycling loading. Comparison with results from in situ microtomographic experiments at the European Synchrotron Facility are provided.

A Lode-dependent prous plasticity model motivated by unit cell analyses

by Postdoctoral Researcher Lars Edvard Dæhli, Department of Structural Engineering, NTNU, Trondheim, Norway

held at DTU Mechanical Engineering 8 March 2018

Abstract:

Unit cell simulations have shown that the third invariant of the stress deviator has a marked effect on the evolution of the porosity. In this study, a modified Gurson model is proposed to include this effect based on unit cell simulations and strain localization analyses. A cubic unit cell with a spherical void located at the centre was modelled by finite elements assuming an elastic-plastic matrix material governed by J2 flow theory. The unit cell simulations exhibit a monotonic decrease in the void growth when the stress state changes from generalized axisymmetric tension via generalized shear to generalized axisymmetric compression for moderate and high levels of stress triaxiality. The Gurson model is then modified by including a term in the void evolution rule that accounts for Lode dependence in a similar manner as proposed by Nahshon and Hutchinson (2008). The modified Gurson model is assessed qualitatively through comparison with the unit cell simulations and strain localization analyses using an imperfection band approach. It is found that the modified Gurson model compares well with the unit cell results. Further, the imperfection band analyses show that the modified Gurson model gives a larger difference between the failure strain levels in generalized axisymmetric tension and compression than the original Gurson model and the shear-modified Gurson model of Nahshon and Hutchinson (2008). The Lode-dependent void evolution rule gives ductility predictions that are in qualitatively good agreement with previously reported studies based on unit cell simulations.

Multi-Scale Optimization Strategies for Electronics Thermal Management & Energy Harvesting

by Senior Research Manager, PhD, Ercan M. Dede, Toyata Research Institute northe of America, Ann Arbor, Michigan, USA

held at DTU Mechanical Engineering 14 March 2018

Abstract:

The compact and power-dense nature of advanced electronics is expected to push the limits of traditional thermal management techniques. At the same time, low-grade waste heat represents a tangible source of inefficiency for future electrified systems. Exploiting effective design optimization strategies in the research and development of new cooling and material technologies enables opportunities for increased system performance. Accordingly, gradient-based structural optimization methodologies and their implementation at multiple scales is the focus of this talk. Specifically, electronics thermal management and waste heat recovery are explored as end applications. At the component level, several case studies are presented to illustrate the technical approach for air, single-phase liquid, and two-phase cooling of automotive power electronics. Heat flow control for enhanced operation of electronics is further discussed, and this topic is connected to the material scale, where thermal composite printed circuit board design for informed heat flow and energy harvesting has benefits. Through these various examples, multi-scale optimization is revealed to be an essential element in the drive towards novel high performance thermal energy management technologies.

Some present challenges in Stuctural Health Monitoring: MEMS sensors and Measurement systems

by Professor Alfredo Cigada, Politecnico di Milano, Italy

held at SDU, University of Southern Denmark 15 March 2018

Abstract:

During the last decades the advent and spread of MEMS sensors have created a revolution in the way some measurements are being carried out. Some basic aspects of measurements required a deep revision of the existing approaches, especially for dynamic testing.
Attention has been redirected to new issues, including networks and of course the management of a big amount of data.

The talk will deal with the research carried out together with one of the world leading semiconductor companies to establish a protocol for the use of the new sensors inside new SHM applicatons: some examples will be provided.

Nonlinear Response Structural Optimization Using the Equivalent Static Loads Method

by Professor Gyung-Jin Park, Department of Mechanical Engineering, Hanyang University, Korea

held at DTU Risø Campus, Roskilde 23 April 2018

Abstract:

Linear static response structural response has been developed quite well by using the finite element method for linear static analysis. However, development is extremely slow for structural optimization where a non linear static analysis technique is required.
Optimization methods using equivalent static loads (ESLs) have been proposed to solve various structural optimization disciplines. The disciplines include linear dynamic response optimization, structural optimization for multi-body dynamic systems, structural optimization for flexible multibody dynamic systems, nonlinear static response optimization and nonlinear dynamic response optimization. The ESL is defined as the static load that generates the same displacement field by an analysis which is not linear static. An analysis that is not linear static is carried out to evaluate the displacement field. ESLs are evaluated from the displacement field, linear static response optimization is performed by using the ESLs, and the design is updated. This process proceeds in a cyclic manner. The method is named as Equivalent Static Loads method for non linear static response Structural Optimization (ESLSO or ESLM).

Out of various methods of ESLM, nonlinear dynamic response optimization is introduced. Nonlinear dynamic response analysis is carried out by a commercial system such as LS/DYNA, the ESLs are generated and linear static optimization is performed by a commercial optimization system such as OptiStruct, Genesis and Nastran. The interface module for the software systems is developed. Size and shape optimizations as well as topology optimization are demonstrated by using examples. Especially, crashworthiness and metal forming optimizations using ESLSO are presented with various examples. Recent development such as the hydroforming problem and the optimal control problem is demonstrated. Currently, ESLM is working with LS/DYNA for nonlinear analysis. The interface with other systems such as Abaqus, Ansys, etc. is discussed. The installation status of the method in the commercial software systems is shown and the future direction of the method is discussed

Transverse Cracking in Polymer Matrix Composites: A (nearly) Complete Story from Molecular Dynamics Simulation to Percolation

by Professor Ramesh Talreja, Department of Aerospace Engineering, Department of Materials Science and Engineering, Texas A&M University, USA

held at DTU Risø Campus, Roskilde 30 April 2018

Abstract:

Formation of a transverse crack, i.e., a crack that forms under application of a tensile force normal to fibers, has been of interest in failure analysis and design of composite materials mainly because it is believed to be the first cracking mode leading to other failure mechanisms causing final failure. Experimental observations suggest that fiber/matrix debonding occurs first, followed by the interface cracks kinking out into the matrix and thereby linking up with other debonds. When sufficiently many debond cracks have coalesced, a continuous transverse crack is believed to form. This presentation will describe analyses at different scales, beginning with the molecular level of the epoxy matrix and ending at the representative microstructural level where the transverse crack begins growing with its own driving force (energy release rate). By means of a molecular dynamics simulation, it will be shown that brittle cavitation under hydrostatic tension in epoxies is most likely the precursor to fiber/matrix debonding. The next level analysis considers the debond crack growth and kink-out as influenced by the neighboring debond cracks. Finally, statistically simulated representative volume elements (RVEs) are analyzed to reveal the effect of manufacturing induced nonuniformilty of fiber distribution on the debond initiation and subsequent transverse crack formation. A percolation concept is then used as a short-cut to determining the applied force at formation of transverse cracks.

A general overview on multiple necking and fragmentation problems in ductile solids subjected to high strain rates

by Associate Professor José A. Rodríguez-Martinez, Department of Continuum Mechanics and Structural Aanaysis, University Carlos III of Madrid, Spain

held at DTU Mechanical Engineering 3 May 2018

Abstract:

Understanding the fragmentation of ductile solids and structures subjected to high velocity impacts or blast loadings has importance in aerospace industry, military applications, civil engineering and geophysical applications. Meteoric cratering, explosive behaviour of projectiles or orbital debris impact on spacecraft structures are examples of events subjected to strain rates within the range >104 s-1. From the early studies in this area – dating in the late 18th century – to the present time, an intense debate on the causes which reside behind the fragmentation of ductile solids has been carried out. In this seminar we will discuss canonical problems of rings (bars) and cylinders (plates) subjected to dynamic radial expansion. The principal advantage of the rapidly expanding ring and cylinder tests is that, due to the symmetry of the problems, the effects of wave propagation are nearly eliminated before flow localization occurs in the form of multiple necks which ultimately lead to the fragmentation of the sample.

Within this framework, we have developed a combined analytical / numerical methodology based on linear stability analyses and finite element calculations that provides new insights into the critical factors that control the processes of multiple necking and fragmentation. Our results suggest that the combination of inertia and stress multiaxiality effects inside a necked section lead to the promotion of a finite number of wavelengths that, at sufficiently high strain rates, determine/control, at least up to some extent, the neck spacing and fragments size. These results argue for the inclusion of a deterministic component within the fragmentation mechanisms and thus complement/enrich the statistical fragmentation theory developed by Mott in the 40s.

Multiscale structural modeling of layered structures

by Professor Roberta Massabò, Department of Civil, Chemical and Environmental Engineering, University of Genova, Italy

held at DTU Mechanical Engineering 9 May 2018

Abstract:

Multilayered composite structures are increasingly being used in many engineering applications, also to withstand extreme loadings in extreme environments. The inhomogeneous material structure and the presence of interfacial imperfections and delaminations profoundly affect local fields and global response of these systems. We have developed a multiscale structural approach which couples a global structural mechanics model and a local cohesive-interface model through homogenization to efficiently and accurately solve thermo-mechanical problems. Applications to wave propagation analyses and delamination fracture will be presented and advantages and limitations of the approach discussed.

Damage mechanisms of fibre composite for wind turbine blades investigated by X-ray tomography and finite element modelling

by Postdoc Kristine Munk Jespersen, Department of Applied Mechanics and Aerospace Engineering, Waseda University, Tokyo, Japan

held at DTU Mechanical Engineering 15 June 2018

Abstract:

Due to their high specific stiffness, strength along with their great fatigue performance, fibre composites are increasingly replacing conventional materials such as aluminium and steel in structural applications. In the case of wind turbines, the main load carrying parts are made from non-crimp fabric based fibre composites where most of the fibres are aligned in the axial direction (uni-directional). Due to the continuous rotation of the blades, fatigue loading of such materials reaches load repetitions in the range of 108-109 cycles, and thus fatigue is an important design concern. However, fatigue design methods commonly used in industry are based on approaches developed for metals despite the damage mechanisms being considerably different. To make it possible to establish new fatigue design criteria suitable for fibre composites, it is necessary to understand the damage mechanisms in depth.

Thus, the current study focused on elucidating the damage initiation and progression mechanisms of non-crimp fabric based fibre composites. Several experimental approaches were established. An ex-situ X-ray CT fatigue testing approach was established and used to monitor the development of fibre fractures in 3D during fatigue loading. Furthermore, a tension clamp solution was established for applied load during X-ray CT, increasing the visibility of the damage in the X-ray CT images. In addition, off-axis crack initiation and growth were monitored by camera and light in-situ during fatigue testing. Finally, finite element modelling was carried out to study the effect of the real fibre bundle structure by extracting the 3D geometry from X-ray CT images. By monitoring the damage initiation and progression it was found that the damage progressed in a 3D manner and that the local variation in the fibre bundle structure highly effected the initiation and progression mechanisms, which also highlighted the importance of 3D modelling. Finite element modelling was carried out based on the real fibre 3D bundle structure obtained from X-ray CT images, and higher stresses were observed in regions where damage also was observed to initiate experimentally. The study provided significant knowledge on the fatigue damage mechanisms of non-crimp fabric based composites and took the initial step towards X-ray CT based modelling of such materials.

Simulation of nonlinear systems with random loads

by Professor Emeritus Kjell Ahlin, Bleking Institute of Technology, Blekinge, Sweden

held at SDU, University of Southern Denmark 20 June 2018

Abstract:

The seminar deals with the problem of how to calculate forced response to a mechanical system with nonlinearities. For a linear system there are many ways to calculate the response. The approach here is to approximate the transfer function force to response with a digital filter. The filter is designed from poles and residues for the transfer function and modal superposition is used.

Nonlinearities may then be added to the linear system. The type of nonlinearities treated are localized, zero memory, nonlinearities. Localized means a nonlinearity is connected from one DOF in the linear system to ground our between two DOFs. The nonlinear force in the nonlinear element should be written as a function of displacement and/or belocity for the involved DOF(s). One or many nonlinear elements may be added.
Several functions in a nonlinear MATLAB toolbox are presented together with examples of use. Some methods for identification and model parameter estimations for nonlinear systems are also shown.

Navier-Stokes CFD for wind turbine aerodynamics: the yawed wind case

by Dr. M. Sergio Campobasso, Department of Engineering, Lancaster University, United Kindom

held at DTU Mechanical Engineering 31 August 2018

Abstract:

Several aerodynamic regimes of horizontal axis wind turbines (HAWTs) can be viewed as periodic. Unsteady aerodynamic flows past structures result in mechanical fatigue, shortening structure life and, in the HAWT case, adversely impacting on wind cost of energy. Thus, accurate predictions of wind turbine unsteady aerodynamics can contribute to cost reductions, but time-domain (TD) Navier-Stokes (NS) Computational Fluid Dynamics (CFD), a simulation technology yielding such prediction improvements, requires often unaffordable computing resources. In this talk, we discuss the nonlinear frequency-domain harmonic balance NS CFD approach to HAWT periodic aerodynamics, and demonstrate its strengths by considering the aerodynamics of yawed wind aerodynamics.

Multimegawatt HAWTs often operate in yawed wind transients, in which the resulting periodic loads acting on blades, drive-train, tower, and foundation adversely impact on fatigue life. Accurately predicting yawed turbine aerodynamics and resulting structural loads is a challenging task, and requires computationally expensive NS CFD. This high computational cost can be significantly reduced by using a frequency-domain framework. The talk summarizes the main features of the COSA harmonic balance Navier-Stokes solver for the analysis of open rotor periodic flows, presents initial validation results based on the analysis of the NREL Phase VI experiment, and discusses the application of this technology to the analysis of a multimegawatt turbine in yawed wind. These analyses indicate that the HB solver determines the considered periodic flows from 30 to 50 times faster than the conventional TD approach with negligible accuracy penalty compared to the latter.

Diagnostics of variable speed machines

by Professor Emeritus Bob Randall, UNSW, Sydney, Australia
held at SDU, University of Southern Denmark 14 September 2018

Abstract:

For many years, condition monitoring (CM) of machines based on vibration analysis was limited to machines running at constant speed, and even for machines such as helicopter gearboxes, it was usually possible to run machines at near constant speed for long enough to capture signals for processing. In recent years, one of the most important developments has been the need to perform CM on machines with variable speed, such as wind turbines, and mobile equipment, for example in mining. A lot can be achieved by using "order tracking", resampling signals at constant intervals of rotation angle (phase), however, this does not make signals periodic, for the following reasons:

1) Angular resampling removes frequency modulation (FM) but not amplitude modulation (AM), so synchronous averaging cannot be used to remove shaft speed related components.

2) Many signals, e.g. from bearing faults, consist of a series of impulse responses (IRs) with a spacing tied to shaft speed, but fixed (resonance) frequencies, so when speed varies the spacing is different, but the length of the IRs is constant, while if angular sampling is used, the spacing is constant but the IR length variable. Synchronous averaging cannot be used in either case.

Nonlinear Resonance in strongly damped systems

by Alexander Fidlin, Karlsruhe Institute of Technology, Institute of Engineering Mechanics, Karlsruhe, Germany

held at DTU Mechanical Engineering 11 October 2018

Abstract:

For many decades, the passage through and capture into the resonance of rotating machines has remained an important topic of scientific research. Most analytical studies consider quasi-conservative systems and owing to the complexity of the mathematical analysis, are limited to describing the dynamics of systems with only one rotational degree of freedom. However, to describe the dynamics of many mechanical systems such as a rotating cylinder partially filled with liquid, automotive drivetrain elements with coaxial shafts, and various types of vibration exciters, it is necessary to consider at least two rotational degrees of freedom. On the other hand, it is often incorrect to consider the damping in such systems as small. Fortunately, taking into account the considerable (non-small) damping makes it possible to significantly reduce the effective order of the control system of equations, which enables a qualitative dynamic analysis of systems with a higher number of degrees of freedom.

The concept of averaging in partially strongly damped dynamic systems is introduced in the talk and then applied to the problem of capturing into / passage through the resonance in systems with gradually increasing complexity. Starting with the classical Sommerfeld effect (one unbalanced rotor – carrier system with one degree of freedom) we go further to vibro exciters (two coaxial unbalanced rotors – carrier system with one or two degrees of freedom) which demonstrate nontrivial dynamics on the slow manifold. Further effects can be find in the self-balancing devices exciters (three coaxial unbalanced rotors – carrier system with one degree of freedom).

The obtained results demonstrate some examples of global bifurcations (dynamical phase transitions) in very simple mechanical system.

Composites for the control of optical, mechanical, and optomechanical processes

by Postdoctoral Fellow Michael J.A. Smith, School of Mathematics, University of Manchester, United Kingdom

held at DTU Mechanical Engineering 9 November 2018

Abstract:

When combining different materials together to form an inhomogeneous composite, most resulting properties (such as the optical, acoustic, or thermal properties) are typically given by some weighted average of the constituent values. I show that this is not the case for the opto-mechanical properties, namely, for a key opto-mechanical response known as photoelasticity, which describes how the optical properties of a medium change under mechanical deformation.

In recent work, I have shown that two materials with zero photoelasticity can be combined to make a composite that is strongly photoelastic. I will examine the role of the unexpected photoelastic contribution in a selection of composite geometries, describing the effect in closed-form

New Data Structures for Engineering Software

by CEO, co-founder nTopology Gradley Rothenberg, New York, USA

held at DTU Compute 12 November 2018

Abstract:

Advanced manufacturing introduces new challenges to the traditional design, analyze, and manufacture process. Design, simulation, and manufacturing engineers need to maximize the fitness of parts using novel production process that offer unprecedented flexibility.

With each additional material and process come new design rules and methodologies, so the successful deployment of advanced manufacturing requires the ability to automate proven workflows. nTopology's computational engineering environment combines CAD, CAE, and CAM to synthesize geometry and simulation results into tuneable computational models. New data structures for representing geometry decouple geometric complexity from the data model thus allowing for fast iteration

Towards Virtual Testing in Hydrogen-Rich Environments

by Emilio Martínez-Pañeda, 1851 Research Fellow, Department of Engineering, Cambridge University, United Kingdom

held at DTU Mechanical Engineering 21 November 2018

Abstract:

Hydrogen is ubiquitous and has remarkable properties. It is the lightest of the elements and it diffuses rapidly through the lattice of solid materials. The use of hydrogen as energy carrier is one of the most promising solutions to our energy crisis; hydrogen-powered cars and trains are already in the market. However, hydrogen is also famed for causing catastrophic failures in metallic components. The ductility and fracture resistance are drastically reduced in the presence of hydrogen and these effects increase with the strength of the metal; a 90% reduction in fracture toughness is observed in high strength steels. Decades of metallurgical progress are effectively compromised by the effect of hydrogen. A problem that was mainly relevant to aggressive environments, e.g. oil and gas extraction, has now important economic consequences in numerous applications, from bridges to wind turbines.

The speaker and his collaborators have been engaged in the development of models capable of predicting hydrogen assisted cracking as a function of the environment, the material and the loading conditions. To solve this longstanding challenge research efforts were focused on four fronts: (1) the mechanisms of hydrogen embrittlement, (2) the plastic response at the small scales involved in crack tip deformation, (3) the characterization of hydrogen transport and the electrochemistry-diffusion interface, and (4) the development of robust numerical methods for crack propagation. The combination of these efforts into a mechanism-based framework for hydrogen embrittlement led to an unprecedented level agreement with experimental measurements. The promising results achieved over a wide range of scenarios have attracted the interest of industrial partners and technical standards organizations, paving the way to extending the success of Virtual Testing in the automotive and aeronautical industries to hydrogen-sensitive applications

Developments in Transfer Matrix Method for Multibody Systems (Rui Method)

by Professor Xiaoting Rui, PhD, Institute of Launch Dynamics, Nanjing University of Science and Technology, Nanjing, China

held at Aarhus Universiy, Department of Engineering 20 December 2018

Abstract:

The transfer matrix method for multibody systems (MSTMM), namely the Rui method, is a rather novel approach for analyzing multibody system dynamics, which was firstly presented in 1993 and has been constantly developing in recent 25 years. For its features that it avoids the global dynamics equations of the system, keeps high computational speed, and allows highly formalized programming, this method has been widely used in science research as well as design of dynamics performance and experiments for various complex mechanical systems. This method has attracted wide attention and over 300 papers have been published by over 200 researchers from many countries. MSTMM has been widely applied in over fifty research directions in science research and key engineering applications including self-propelled artillery, shipborne gun, “metal storm”, antiaircraft gun, spin tube gun, vehicular MLRS, airborne MLRS, shipborne MLRS, cannon on helicopter, tank, vehicular missile system, fly-cutting machine tool, inertial measurement unit system, launch vehicle, missile, aerospace aircraft, submarine, underwater towed system, piezoelectric actuator, controlled flexible manipulators, intelligent flexible four-bar linkage devices, super long stay cable, earthquake resistant civil structures, immersed tunnel, robots, mobile concrete truck boom, vibration screen, vibration compaction, road roller, wind turbine, wind turbine tower, gas turbine, low pressure rotor of gas turbine, high pressure compressor of gas turbine, large-scale rotary machine, feeding platform, parachute-submissile, rocket projectile, truck cranes, floating bridge, wing, five-axis CNC machine tool, heavy duty machine tool, machine tool spindle, servo turret, high pressure gas well, diesel engine, roots blower with double rotor, ship's anti-vibration mounting system, ship pipeline, bearing-rotor, vehicle suspension, etc. In this report, the following aspects are systematically reviewed: history, basic principles, formulas, algorithm, automatic deduction theorem of overall transfer equation, visualized simulation and design software, comparison with other dynamics methods, highlights, tendency, and applications.

5. DCAMM ANNUAL SEMINAR SPEAKER 2018

The DCAMM Annual Seminar Speaker was this year given by Professor Ken Kamrin from Massachusetts Institute of Tecnhnology.
The seminar was given at DTU Wednesday 12 December and at AU Thursday 13 December, respectively.

Continuum modeling of flowing grains

Abstract

Granular materials are common in everyday life but are historically difficult to model. This has direct ramifications owing to the prominent role granular media play in multiple industries and terrain dynamics. One can attempt to track every grain with discrete particle methods, but realistic systems are often too large for this approach and a continuum model is desired. However, granular media display unusual behaviors that complicate the continuum treatment: they can behave like solid, flow like liquid, or separate into a "gas", and the rheology of the flowing state displays remarkable subtleties that have been historically difficult to model. To address these challenges, in this talk we develop a family of continuum models and solvers, permitting quantitative modeling capabilities for a variety of applications, ranging from general problems to specific techniques for problems of intrusion, impact, driving, and locomotion in grains.
To calculate flows in general cases, a rather significant nonlocal effect is evident, which is well-described with our recent nonlocal model accounting for grain cooperativity within the flow rule. On the other hand, to model only intrusion forces on submerged objects, we will show, and explain why, many of the experimentally observed results can be captured from a much simpler tension-free frictional plasticity model. This approach gives way to some surprisingly simple general tools, including the granular Resistive Force Theory, and a broad set of scaling laws inherent to the problem of granular locomotion. These scalings are validated experimentally and in discrete particle simulations suggesting a new down-scaled paradigm for granular locomotive design, on earth and beyond, to be used much like scaling laws in fluid mechanics.

6. LIST OF DCAMM S-REPORTS (from no. S85)

S1 – S107: Ask for separate book.

S108. JONCQUEZ, SOIZIC ANNICK GABRIELLE: Second-order Forces and Moments acting on Ships in Wawes (August 2009)

S109. DÜHRING, MARIA BAYARD: Optimization of acoustic, optical and optoelastic devices (July 2009)

S110. NIELSEN, KIM LAU: Modelling of damage development and ductile failure in welded joints (December 2009)

S111. ESTUPINAN, EDGAR ALBERTO: Feasibility of Applying Controllable Lubrication Techniques to Reciprocating Machines (December 2009)

S112. BANG-MØLLER, CHRISTIAN: Design and Optimization of an Integrted Biomass Gasification and Solid Oxide Fuel Cell System (April 2010)

S113. PEDERSEN, RUNE: Dynamic Modeling of wind Rubine Gearboxes and Experimental Validation (April 2010)

S114 BRIX, WIEBKE: Modelling refrigerant distribution in minichannel evaporators (May 2010)

S115. HUMMELSHØJ, THOMAS STRABO: Mechanisms of metal dusting corrosion (December 2009)

S116. CIPOLLA, LEONARDO: Conversion of MX Nitrides to Modified Z-Phase in 9-12%Cr Ferritic Steels (March 2010)

S117. HAIDER, SAJJAD: Two Stroke diesel Engines for Large Ship Propulsion (January 2011).

S118. VELTE, CLARA: Simultation and control of Wind Turbine Flows using Vortex Generators (February 2009)

S119. ENZ, STEPHANIE: Factors Affecting Coriolis Flowmeter Accuracy, Precision, and Robustness (September 2010)

S120. KJÆRSGAARD-RASMUSSEN, JIMMY: Inside-out electrical capacitance tomography for downhole multiphase flow evaluation (April 2010)

S121. LAJIC, ZORAN: Fault-Tolerant Onboard monitoring and Decision Support Systems (October 2010)

S122. SVENDSEN, MARTIN NYMANN: Wind Turbine Rotors with Active Vibration Control (January 2011)

S123 CLAUSEN, LASSE RØNGAARD: Design of novel DME/methanol synthesis plants based on gasification of biomass (February 2011)

S124 SHIN, KEUN WOO: Cavitation simulation on marine propellser (November 2010)

S125 HAUGAARD, ASGER MARTIN: On Controllable Elastohydrodynamic Fluid Film Bearings (May 2010)

S126 PEDERSEN, TROELS DYHR: Homogeneous Charge Compression Ignition Combustion of Dimethyl Ether (May 2011)

S127 GARCÌA, NÈSTOR RAMOS: Quasi-3d aerodynamic code for analysing dynamic flap response (April 2011)

S128 ZAMBRANO, HARVEY A: Molecular Dynamics Studies of Nanofluidic Devices (May 2011)

S129 AAGE, NIELS: Topology optimization of radio frequency and microwave structures (April 2011)

S130 MATZEN, RENÉ: Topology Optimization for Transient Wave Propagatio Problems (March 2011)

S131 ANDREASEN, CASPER SCHOUSBOE: Multiscale topology optimization of solid and fluid structures (May 2011)

S132 KÆRN, MARTIN RYHL: Analysis of flow maldistribution in fin-and-tube evaporators for residential air-conditioning systems (August 2011)

S133 BEHRENS, TIM: Simulation of Moving Tailing edge Flaps on a Wind Turbine Blade using a Nivier-Stokes based Immersed Boundary Method (July 2011)

S134 BLASQUES, JOSÉ PEDRO ALBERGARIA AMARAL: Optimal Design of Laminated Composite Beams (August 2011)

S135 AZIZI, REZA: Multi-scale modelling of composites (September 2011)

S136 JACOBSEN, NIELS GJØL: A Full Hydro- and Morphodynamic Description of Breaker Bar Development (April 2011)

S137 MOROSI, STEFANO: From Hybrid to Actively-Controlled Gas Lubricated Bearings – Theory and Experiemt (September 2011)

S138 KÆRGAARD, KASPER: Numerical Modeling of Shoreline Undulations (September 2011)

S139 BHOWMIK, SUBRATA: Modelling and Control of Magnetorheological Damper: Real-time implementation and experimental verification (October 2011)

S140 ANDKJÆR, JACOB: Wave Manipulation by Topology Optimization (January 2012)

S141 MOSLEMIAN, RAMIN: Residual Strength and Fatigue Lifetime of Debond Damaged Sandwich Structures (September 2011)

S142 HANSEN, SØREN VINTHER: Performance Monitoring of Ships (September 2011)

S143 HANSEN, NILAS MANDRUP: Interaction between Seabed Soil and Offshore Wind Turbine Foundations (March 2012)

S144 THOMSEN, KIM: Modeling of dynamically loaded hydrodynamic bearings at low Sommerfeld numbers (March 2012)

S145 WANG, FENGWEN: Systematic Design of Slow Light Waveguides (August 2012)

S146 RASMUSSEN, JOHANNES TOPHØJ: Particle Methods in Bluff Body Aerodynamics (October 2011)

S147 ANDERSEN, SØREN BØGH: Design and Optimization of Gearless Drives using Multi-Physics Approach (September 2012)

S148 LAHRIRI, SAID: On the Rotor to Stator Contact Dynamics with Impacts and Friction – Theoretical and Experimental Study (November 2012)

S149 VARELA, ALEJANDRO CERDA: Mechatronics Applied to Fluid Film Bearings: Towards More Efficient Machinery (December 2012)

S150. SCHLECHTINGEN, MEIK: A Global Condition Monitoring System for Wind Turbines (February 2013)

S151. SENG, SOPHEAK: Slamming and Whipping Analysis of Ships (December 2012)

S152: HOSSEINZADEH, ELHAM: Fuel Cell Hydrogen manifold for Lift Trucks (December 2012)

S153: DIMITROV, NIKOLAY: Structural Reliability of wind Turbine Blades: Design Methods and Evaluation (February 2013)

S154: RABBANI, ABID: Dynamic Performance of a PEM Fuel Cell System (March 2013)

S155: LINDBERG, OLE: Multiscale Simulation of Breaking Wave Impacts (March 2012)

S156: NIELSEN, MARTIN BJERRE: Dynamics of Rigid Bodies and Flexible Beam Structures (September 2013)

S157: JENSEN, MICHAEL V.: Heat Transfer in Large Two-Stroke Marine Diesel Engines (August 2012)

S158: TORRY-SMITH, JONAS MØRKEBERG: Designing Mechatronic Products – Achieving Integration by Means of Modelling Dependencies (February 2013)

S159: POULIOS, KONSTANTINOS: Tribology of A Combined Yaw Bearing and Brake for Wind Turbines (September 2013)

S160: JØRGENSEN, MARTIN FELIX: Aerodynamic and Mechanical System Modelling (November 2013)

S161: ROTHUIZEN, ERASMUS DAMGAARD: Hydrogen Fuelling Stations – A Thermodynamic Analysis of Fuelling Hydrogen Vehicles for Personal Transportation (September 2013)

S162: WÖRÖSCH, MICHAEL: End-to-end requirements management for multiprojects in the construction industry (February 2014)

S163: BUREAU, EMIL: Experimental Bifurcation Analysis Using contro-Based continuation (January 2014)

S164: VAJARI, DANIEL ASHOURI: Micromechanical failure in fiber-reinforced composites (March 2014)

S165: JOHANSEN, AXEL OHRT: Numerical study of evaporators in power plants for improved dynamic flexibility (March 2013)

S166: ANDERSEN, INGRID MARIE VINCENT: Full Scale Measurements of the Hydro-Elastic Response of Large Container Ships for Decision Support (April 2014)

S167: GIVERSEN, SØREN: Blast Testing and Modelling of composite Structures (March 2014)

S168: SAREMI, SINA: Density-Driven Currents and Deposition of Fine Materials (April 2014)

S169: CERULLO, MICHELE: Computational stress and damage modelling for rolling contact fatigue (September 2014)

S170: NGUYEN, TUONG-VAN: Modelling, analysis and optimization of energy systems on offshore platforms (October 2014)

S171: AMINI AFSHAR, MOSTAFA: Towards Predicting the Added Resistance of Slow Ships in Waves (October 2014)

S172: ANDREASSEN, ERIK: Optimal Design of Porous Materials (January 2015)

S173: JOHANSEN, VILLADS EGEDE: Structural colours and applications to anodized aluminium surfaces (November 2014)

S174: BRUUN, HANS PETER LOMHOLT: PLM support to architecture based development – Contribution to computer-supported architecture modelling (January 2015)

S175: FUGLEDE, NIELS: Kinematics and Dynamics of Roller Chain Drives (July 2014)

S176: LARSEN, ULRIK: Design and modelling of innovative machinery systems for large ships (October 2014)

S177: LARSEN, JON STEFFEN: Nonlinear Analysis of Rotors Supported by Air Foil Journal Bearings – Theory & Experiments (February 2015)

S178: INGVORSEN, KRISTIAN MARK: Investigations of the turbulent swirling flow in a two-stroke marine diesel engine (November 2013)

S179: ERIKSEN, RASMUS NORMANN: High Strain Rate characterization of Composite materials (March 2014)

S180: PEDERSEN, BENJAMIN PJEDSTED: Data-driven Vessel Performance Monitoring (June 2014)

S181: JANAKIRAMAN, SHRAVAN: Fatigue and Wer in Rolling and Sliding Contacts (November 2014)

S182: CHRISTIANSEN, NIELS HØRBYE: Hybrid Method Simulation of Slender Marine Structures (August 2014)

S183: PIEROBON, LEONARDO: Novel design methods and control strategies for oil and gas offshore power systems (October 2014)

S184: DOU, SUGUANG: Gradient-based optimization in nonlinear structura dynamics (April 2015)

S185: CORDTZ, RASMUS FAURSKOV: The Influence of Fuel Sulfur on the Operation of Large Two-Stroke Marine Diesel Engines (January 2014)

S186: JEPSEN, ALLAN DAM: ARCHITECTURE DESCRIPTIONS – A contribution to Modeling of Production System Architecture (September 2014)

S187: OMMEN, TORBEN SCHMIDT: Heat Pumps in CHP Systems. High-efficienty Energy System Utilising Combined Heat and Power and Heat Pumps (April 2015)

S188: MODI, ANISH: Numerical evaluation of the Kalina cycle for concentrating solar power plants (August 2015)

S189: ENEMARK, SØREN: Integration of shape Memory Alloys into Low-Damped Rotor-Bearing Systems – Modelling, Uncertainties and Experimental Validation (October 2015)

S190: WRONSKI, JORRIT: Design and Modelling of Small Scale Low Temperature Power Cycles (May 2015)

S191: ANDERSEN, FREDERIK HERLAND: Integrated Analysis of the Scavenging Process in Marine Two-Stroke Diesel Engines (August 2015)

S192: GUOLAUGSSON, TÓMAS VIGNIR: Modelling architectures in multi-product oriented technology development (July 2015)

S193: CHRISTIANSEN, CHRISTIAN KIM: Diesel Engine Tribology (December 2015)

S194: COSTACHE, ANDREI: Anchoring FRP Composite Armor in Flexible Offshore Riser Systems (October 2015)

S195: COUTURIER, PHILIPPE JACQUES: Structural modelling of composite beams with application to wind turbine rotor blades (January 2016)

S196. VÁSQUEZ, FABIÁN GONZALO PIERART: Model-Based Control Design for flexible Rotors Supported by Active Gas Bearings - Theory & Experiment (January 2016)

S197. MAZZUCCO, ANDREA: Tank designs for combined high-pressure gas and solid-state hydrogen storage (January 2016)

S198. HEJLESEN, MADS MØLHOLM: A high order regularisation method for solving the Poisson equation and selected applications using vortex methods (February 2016)

S199. ÓLAFSSON, ÖLAFUR MAGNÚS: Improved Design Basis of Welded Joints in Seawater (March 2016)

S200. PARSLOV, JAKOB FILIPPSON: Defining Interactions and Interfaces in Engineering Design (March 2016)

S201. FRANDSEN, NIELS MORTEN MARSLEV: Design of advanced materials for linear and nonlinear dynamics (April 2016)

S202. MONTAZERI, NAJMEH: Estimation of waves and ship responses using onboard Measurements (March 2016)

S203. BRODERSEN, MARK LAIER: Damping of Wind turbine tower vibrations (December 2015)

S204. MANCA, MARCELLO: Fracture Characterization of Sandwich Face/Core Interfaces (March 2015)

S205. ANDERSEN, JAKOB BEJBRO: PSS Support for Maritime Technology Ventures: From Exploration to Methodology and Theory (November 2015)

S206. MOUGAARD; KRESTINE: A framework for conceptualisation of PSS solutions: On network-based development models (January 2016)

S207. JENSEN, JONAS KJÆR: Industrial heat pumps for high temperautre process applications - A numerical study of the ammonia-water hybrid absorption-compression heat pump (December 2015)

S208. CHRISTIANSEN, RASMUS E.: Topology Optimization for Wave Propagation Problems with Experimental Validation (June 2016)

S209. NEUMEYER, STEFAN: Macromechanical Parametric Amplification (April 2016)

S210. MADSEN, STINE SKOV: Dynamic Modeling of Pavements with Application to Deflection Measurements (July 2016)

S211. SALAZAR, JORGE ANDRÉS GONZÁLEZ: Towards Model-Based Control Design for Flexible Rotors Supported by Active Tilting Pad Bearings - Theory & Equipment (August 2016)

S212. VOIGT, ANDREAS JAUERNIK: Towards Identification of Rotordynamic Properties for Seals in Multiphase Flow Using Active Magnetic Bearings. Design and Commissioning of a Novel Test Facility (June 2016)

S213. EL-NAAMAN, SALIM ABDALLAH: Miro-Structural Evolution and Size-Effects in Plastically Deformed Single Crystals - Strain Gradient Continuum Modeling (July 2016)

S214. CLAUSEN, ANDERS: Topology Optimization for Additive Manufacturing (September 2016)

S215. RAVN, POUL MARTIN: Coherent Architecture Development as a Basis for Technology Development (December 2015)

S216. ALEXANDERSEN, JOE: Efficient topology optimisaton of multiscale and multiphysics problems (September 2016)

S217. KONTOS, STAVROS: Robust Numerical Methods for Nonlinear Wave-Structure Interaction in a Moving Frame of Reference (August 2016)

S218. LYTCHKE-JØRGENSEN, CHRISTOFFER: Design and optimization of flexible multi-generation systems (April 2016)

S219. CHRISTENSEN, MARTIN EBRO: Applying Robust Design in an Industrial Context (August 2015)

S220. HØGH, JACOB HEROLD: Hybrid Simulation of Composite Structures (January 2016)

S221. NIELSEN, BO BJERREGAARD: Combining Gas Bearing and Smart Material Technologies for Improved Machine Performance Theory and Experiment (July 2016)

S222. OBEIDAT, ANAS: Development of Smoothed Particle Hydrodynamics for flow in Complex Geometries and Application of Open Source Software for the Simulation of Turbulent Flow (June 2014)

S223. REGENER, PELLE BO: Hull-Propeller Interaction and Its Effect on Propeller Cavitation (November 2016)

S224. GÖHLER, SIMON MORITZ: Metric-driven Robust Design – Robustness Quantification of Complex Engineering Systems (February 2017)

S225. LAURIDSEN, JONAS: Control design of Active Magnetic Bearings for Rotors Subjected to Destabilising Seal Forces Theory & Experiment (May 2017)

S226. WESTLYE, FREDRIK REE: Experimental Study of Liquid Fuel Spray Combustion (June 2016)

S227. SIGURJONSSON, HAFTHOR ÆGIR: Modeling and Evaluation of Bioenergy and Agriculure system Integration (January 2016)

S228. LINHARES DA FONSECA, CESAR AUGUSTO LAMPE: A theoretical-experimental study of backup bearings – The pinned vs ball bearing (July 2017)

S229. KERMANI, NASRIN ARJOMAND: Design and prototyping of an ionic liquid piston compressor as a new generation of compressor for hydrogen refueling stations (May 2017)

S230. NØRGAARD, SEBASTIAN ARLUND: Topology optimization and lattice Boltzmann methods (October 2017).

S231. BAJRIĆ-HODŽIĆ, ANELA: Identification of damping from structural vibrations (October 2017)

S233. PEDERSEN, SØREN NYGAARD: Perceptual Robust Design (January 2017)

S234. NELLEMANN, CHRISTOPHER: Micro-structural evolution in plastically deformed crystalline materials (December 2017)

S235. BÜHLER, FABIAN: Energy efficiency in the industry: A study of the methods, potentials and interactions with the energy system (March 2018)

S236. BOORLA, SRINIVAS MURTHY: Zero Variation Manufacturing (ZVM) – A strategy for robust products with zero perceivable variation (January 2018)

S237. MARGALIT, JONATAN: Development of matural seabed forms and their interaction with offshore wind farms (Devember 2017)

S238. TIDEMANN, LASSE: Cyclic Yielding of Tubular Structures (January 2018)

S239. KJÆR, LOUISE LAUMANN: Environmental Impacts of Product/Service-Systems – broadening the life cycle assessment methodology (January 2018)

S240. KLIEM, MATHIAS: Damping of Composite Mast Structures (March 2018)

S241. SASEENDRAN, VISHNU: Fracture Chracterizatio and Analysis of Debonded Sandwich Composites (December 2017)

S242. PAGOROPOULOS, ARIS: Product/service systems in the maritime industry – from economic evaluation throughout the life sycle to implementation (September 2017)

S243. REBOUCAS, GERALDO FRANCISCO DE SOUZA: Vibro – Impact Mechanics. Analytical, Numerical and Experimental Investigations (September 2018)

S244. LØKKEGAARD, MARTIN: Top-Down Financially Driven Modularization (October 2017)

S245. LUNDGAARD, CHRISTIAN: Topology Optimization for multiphysics problems: Thermoelectric energy conversion and fluid-structure-interaction (June 2018)

S246. DAGNÆS-HANSEN, NIKOLAJ A.: Magnetic Bearings for Offshore Flywheel Energy Storage Systems (July 2018)

S247. JUUL, KRISTIAN JØRGENSEN: Steady-state and self-similar solution techniques in solid mechanics (August 2018)

S248. SPIETZ, HENRIK JUUL: A Vortex-particle Mesh Method for Large Eddy Simulation of Bluff Body Aerodynamics (June 2018)

S249. CHOI, JU-HYUCK: Efficient Estimation of Extreme Roll Motion of Ships (October 2018)

S250. OVERGAARD, HANNIBAL TOXVÆRD: Lubricant Transport across Piston Rings in large Two-Stroke Diesel Engines – Theory and Experiments (September 2018)

S251. MERONI, ANDREA: Design and Optimization of Turbomachinery for Thermodynamic Cycles Utilizing Low-Temperature Heat Sources (May 2018)

S252. RODRIGUES, VINIVIUS PICANÇO: “In search of gold”: measuring performance and evaluating potential business benefits of eco-design (July 2018)

S253. FARSHIDI, ARASH: Disbond Damage in Aircraft Sandwich Structures (January 2019)

254. GROEN, JEROEN PETER: Multi-scale design methods for Topology Optimization (December 2018)

7. OTHER THESES

ADDASSI, MOUADH: “Transport in concrete with new CO2 reduced cements – Reactive Transport Model for Durability Estimations”, DTU Civil Engineering, 2018, PhD Thesis.

ANDERSEN, MICHAEL STYRK: Bridge aeroelasticity and the non-flutter design principle for long span bridges”, SDU, Mechanical Engineering, 2018, PhD Thesis

ARDILA, OSCAR GERARDO CASTRO: “Fatigue strength of composite wind turbine blade structures”, DTU Wind Energy, 2018, PhD Thesis.

ASGARPOUR, MASOUD: “Risk and Reliability based O&M Planning of Offshore Wind Farms”, Aalborg University, Department of Civil Engineering, 2018, PhD Thesis.

BENDER, JENS JAKOB: “The Effect of Defects on the Strength of Laminates and Sub-structures in Wind Turbine Blades”, Aalborg University, Department of Materials and Production, 2018, PhD Thesis.

BIONDANI, FRANCESCO GIUSEPPE: “Process chains for Advanced Tooling based on Additive Manufacturing”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

BRÜSKE, HENNING: “Structural Test Design with Value of information”, DTU Civil Engineering, 2018, PhD Thesis.

BURLINA, CELESTE: “Aerodynamics of bridge cables with concave fillet”, DTU Civil Engineering, 2018, PhD Thesis.

COLONE, LORENZO: “Cost-effective strategies for wind farum Q&M”, DTU Wind Energy, 2018, PhD Thesis.

DAHL, MAGNUS: “Production planning of energy systems”, AU Department of Engineering, 2018, PhD Thesis.

DHAR, SOMRITA: “Microstructure and Fatigue properties of railway steels for switches and crossings”, DTU Wind Energy, 2018, PhD Thesis.

DZIALO, CHRISTINE MARY: “Personalized musculoskeletal modelling”, Aalborg University, Department of Materials and Production, 2018, PhD Thesis.

FEDOROVA, IRINA: “Alloy development for high Cr martensitic steel”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

GHADIRIAN, AMIN: “Advanced CFD computation of breaking wave loads on offshore wind turbine structures”, DTU Wind Energy, 2018, PhD Thesis.

HASANNASAB, MARZIEH: “Mathematic and Efficient Signal Representation”, DTU Compute: Department of Appplied Mathematics and Computer Science, 2018, PhD Thesis.

JOSHY, SALIL: “Humidity control inside electronic enclosures: Developing design principles based on emperial understanding”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

JURADO, ANTONIO MANUEL PEGALAJAR: “Cascaded design tools for 10MW offshore wind turbine floaters”, Cascaded design tools for 10MW offshore wind turbine floaters”, DTU Wind Energy, 2018, PhD Thesis.

JUUL, MARTIN ØRUM ØRHEM: “Operational Modal Analysis in the InnoMill project”, AU Department of Engineering, 2018, PhD Thesis.

KAMARI, ALIAKBAR: “A multi-methodology and sustainability-supporting framework for implementation and assessment of a holistic building renovation”, AU Department of Engineering, 2018, PhD Thesis.

LEGARTH, BRIAN NYVANG: “Non-linear Mechanics of Anisotropic Materials – failure and homogenization”, DTU Mechanical Engineering, 2018, Doctoral Thesis.

MISCHKOT, MICHAEL: “Advanced Process Chains for Prototyping and Pilot Production based on Direct Rapid Soft Tooling”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

MOHAMMAADI, ALI: “Modelling for Dynamic Length Metrology in Accurate Manufacture”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

NASIRABADI, PARIZAD SHOJAEE: “Modelling Climatic Reliability of Electronic Devices”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

NICOLAI, GIULIO: “Cyclic Behaviour of Laterally Loaded Monopiles in Sand Wupporting Offshore Wind Turbines”, Aalborg University, Department of Civil Engineering, 2018, PhD Thesis.

NIESSEN, FRANK: “Phase transformations in supermartensitic stainless steels”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

OLSEN, PETER: “Automated Operational Modal Analysis – Using Low Order Time Domain Identification Techniques and the Sliding Filter Stabilization Diagram”, AU Department of Engineering, 2018, PhD Thesis.

PIOTROWSKA, KAMILA: “Water film formation on PCBA surface”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

RAVENDRAN, RATHESAN: ”Cylinder Lubrication of Two-Stroke Diesel Engines”, Aalborg University, Department of Materials and Production, 2018, PhD Thesis.

RUIZ-MUNOZ, GUSTAVO-ADOLFO: “Fracture mechanics approach to prohabilistic inspection planning of offshore foundations tructures for wind turbines”, DTU Wind Energy, 2018, PhD Thesis.

SABALIAUSKAS, TOMAS:”Deformation dependent states in cyclic disturbed sand”, Aalborg University, Department of Civil Engineering, 2018, PhD Thesis.

SIMONSEN, THOMAS RYE: “Pore water pressure response and heave of Paleogenne clays in connection to deep excavation and pile driving”, AU Department of Engineering, 2018, PhD Thesis.

STALIULIONIS, ZYGIMANTAS: “Developing semi-empirical models for predicting climate inside electronic device enclosures”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

SØRENSEN, JESPER HARRILD: “Design and Modeling of Structural Joints in Precast Concrete Structures”, DTU Civil Engineering, 2018, PhD Thesis.

THYBO, ANNA EMILIE: “Corrosion-induced Cracking in reinforced concrete structures – A numerical Study”, DTU Civil Engineering, 2018, PhD Thesis.

ULRIKSEN, MARTIN DALGAARD: “Damage Localization for Structural Health Monitoring: An Exploration of Three New Vibration-based Schemes”, Aalborg University, Department of Civil Engineering, 2018, PhD Thesis.

VESTER-PETERSEN, JOAKIM: “Topology Optimization of Field-enhancing Nanostructures for Photovoltaic Applications”, AU Department of Engineering, 2018, PhD Thesis.

WU, DUOLI: “Corrosion Resistant Coating for Biomas Firing”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

ÜSTÜNYAGIZ, ESMERAY: “An Off-line Methodology to Determine Limits of Lubrication in Sheet Metal Forming”, DTU Mechanical Engineerinig, 2018, PhD Thesis.

8. DCAMM COURSES GIVEN IN 2018

DTU Mechanical Engineering

High Performance Computing: FORTRAN, OpenMP and MPI
Advanced Engineering Thermodynamics
PhD course on application of x-ray diffraction in materials science
Micro Mechanical Systems Design and Manufacture (PhD summer school)
Nanotribology: Theory and application
Measurement uncertainty estimation using statistical methods

DTU Compute

PhD course on Uncertainty Quantification

Aalborg University's Doctoral School of Engineering and Science

Analysis and Gradient Based Optimization of Laminated Composite Structures

APPENDIX: List of members 2018

Abbreviations:

from Technical University of Denmark

CIVIL: Dept. of Civil Engineering
COMPUTE: Dept. of Applied Mathematics and Computer Science
MEK-FAM: Dept. of Mechanical Engineering, Solid Mechanics
MEK-FVM: Dept. of Mechanical Engineering, Fluid Mechanics, Coastal and Maritime Engineering
MEK-K&P: Dept. of Mechanical Engineering, Engineering Design and Product Development
MEK-MPP: Dept. of Mechanical Engineering, Manufacturing Engineering
MEK-MTU: Dept. of Mechanical Engineering, Materials and Surface Engineering
MEK-TES: Dept. of Mechanical Engineering, Thermal Energy
WIND: DTU Wind Energy

from Aalborg University

CIVIL, AAU: Department of Civil Engineering
MATH, AAU: Department of Mathematicl Sciences
MECH, AAU: Department of Materials and Production

from Aarhus University

ENG, AU: Department of Engineering

from University of Southern Denmark

SDU-ITI: Dept. of Technology and Innovation

Achour, Soufian Ben	(MEK-MPP)	PhD student
Aghababaei, Ramin	(ENG, AU)	Assistant Professor
Alexandersen, Joe	(MEK-FAM)	Postdoc
Ambat, Rajan	(MEK-MTU)	Professor
Amini Afshar, Mostafa	(MEK-FVM)	Postdoc
Andersen, Lars Vabbersgaard	(ENG, AU)	Professor, PhD
Andersen, Michael Skipper	(MECH, AAU)	Associate Professor
Andersen, Mikkel	(MATH, AAU)	Associate Professor
Andersen, Morten Nørgaard	(MEK-FAM)	PhD student
Andersen, Poul	(MEK-FVM)	Associate Professor
Andersen, Rasmus Grau	(MEK-FAM)	PhD student
Andersen, Sebastian Aagaard	(MEK-MPP)	PhD student
Andersen, Søren Juhl	(WIND)	Postdoc
Andreasen, Casper Schousboe	(MEK-FAM)	Associate Professor
Andreasen, Jens H.	(MECH, AAU)	Associate Professor, PhD
Andreasen, Jesper Graa	(MEK-TES)	PhD student
Andreasen, Mogens Myrup	(MEK-K&P)	Professor Emeritus
Andreassen, Michael Joachim	(CIVIL)	Associate Professor
Andresen, Gorm Bruun	(ENG, AU)	Asstistant Professor
Andrillo, Tito	(MEK-MPP)	Postdoc

Arora, Vikas	(SDU-ITI)	Associate Professor
Asadzadeh, Seyed Saeed	(MEK-FVM)	PhD student
Askhøj, Christoffer	(MEK-K&P)	PhD student
Azizi, Reza		Elected member, PhD
Back-Pedersen, Andreas		Elected member, PhD.
Bai, Shaoping	(MECH, AAU)	Associate Professor
Baldasso, Enrico	(MEK-TES)	PhD student
Balling, Ole	(ENG, AU)	Aff. Professor
Bangaru, Ashish Kumar	(WIND)	PhD student
Baruffi, Federico	(MEK-MPP)	PhD student
Basdasso, Enrico	(MEK-TES)	Scientific Assistant
Basso, Alberto	(MEK-MPP)	Scientific Assistant
Bay, Niels O.	(MEK-MPP)	Professor Emeritus
Bayat, Mohamad	(MEK-MPP)	PhD student
Beelen, Peter	(COMPUTE)	Professor MSO
Belloni, Federico	(WIND)	PhD student
Bender, Jens Jakob	(MECH, AAU)	PhD student
Bendsøe, Martin		Elected member, Professor Emeritus, dr. techn.
Bentzon, Jakob Roar	(MEK-FVM)	PhD student
Bergamini, Riccardo	(MEK-TES)	PhD student
Berggreen, Christian	(MEK-FAM)	Associate Professor
Bertram, Christian Alexander	(MEK-K&P)	PhD student
Bingham, Harry B.	(MEK-FVM)	Professor
Biondani, Francesco G.	(MEK-MPP)	Postdoc
Bisacco, Giuliano	(MEK-MPP)	Associate Professor
Bjarklev, Kristian	(MEK-K&P)	PhD student
Bjerregård, Mathias Blicher	(COMPUTE)	PhD student
Blasques, Jose		Elected member, PhD
Blomsma, Fenna	(MEK-K&P)	Postdoc
Bluhm, Gore Lukas	(MEK-FAM)	PhD student
Bohr, Thomas		Elected member, Professor
Borg, Michael	(WIND)	Postdoc
Borg, Ulrik		Elected member, Senior Engineer
Brander, David	(COMPUTE)	Associate Professor
Brandt, Anders	(SDU-ITI)	Associate Professor
Branner, Kim	(WIND)	Senior Researcher
Bredmose, Henrik	(WIND)	Professor
Brilhuis-Meijer, Ellen	(MEK-K&P)	PhD student
Brockhoff, Per B.	(COMPUTE)	Head of Department, Professor
Brok, Niclas Lauersen	(COMPUTE)	PhD student
Bræstrup, M. W.		Elected member, PhD
Bräuner, Lars	(ENG, AU)	Associate Professor
Brøns, Marie	(MEK-FAM)	PhD student
Brøns, Morten	(COMPUTE)	Professor, PhD
Budzik, Michal	(ENG, AU)	Assistant Professor
Bucinskas, Paulius	(ENG, AU)	PhD student
Buhl, Thomas		Elected member, PhD
Butera, Giacomo	(MEK-TES)	PhD student
Bühler, Fabian	(MEK-TES)	Postdoc
Calaon, Matteo	(MEK-MPP)	Researcher
Campo Muga, Ruben del	(MEK-MTU)	Postdoc
Carlsen, Henrik	(MEK-TES)	Professor Emeritus
Carstensen, Stefan	(MEK-FVM)	Associate Professor
Castro Ardilla, Oscar Gerardo	(WIND)	PhD student
Castro, Miguel Nobre	(MECH, AAU)	PhD student
Cederlöf, Daan Jonas Hottentot	(WIND)	PhD student

Cederkvist, Jan		Elected member, PhD.
Checchi, Alessandro	(MEK-MPP)	PhD student
Chen, Xiao	(WIND)	Researcher
Chivaee, Hamid Sarlek	(WIND)	Postdoc
Christensen, Carsten Keinicke Fjord	(MEK-K&P)	PhD student
Christensen, Erik Damgaard	(MEK-FVM)	Professor, Head of Section
Christensen, Georg Kronborg	(MEK-K&P)	Associate Professor
Christensen, Ole	(COMPUTE)	Professor, dr.scient.
Christiansen, Christian Kim		Elected member, PhD.
Christiansen, Jesper De Claville	(MECH, AAU)	Professor
Christiansen, Ramus Ellebæk	(MEK-FAM)	Postdoc
Christiansen, Thomas Lundin	(MEK-MTU)	Associate Professor
Clausen, Johan Christian	(CIVIL, AAU)	Associate Professor
Clausen, Lasse Røngaard	(MEK-TES)	Associate Professor
Colone, Lorenzo	(WIND)	PhD student
Comminal, Raphael Benjamin	(MEK-MPP)	Researcher
Conti, Davide	(WIND)	PhD student
Cordtz, Rasmus Faurskov	(MEK-TES)	Researcher
Cornean, Horia	(MATH, AAU)	Professor
Criscuolo, Gennaro	(MEK-TES)	PhD student
Dahl, Kristian Vinter	(MEK-MTU)	Senior Researcher
Dahmen, Thomas	(MEK-MPP)	PhD student
Dalla, Guiseppe Costa	(MEK-MPP)	Postdoc
Damkilde, Lars	(CIVIL, AAU)	Professor
Dammann, Bernd	(COMPUTE)	Associate Professor
Danielak, Anna Halina	(MEK-MPP)	Scientific Assistant
Danielsen, Hilmar K.	(WIND)	Senior Researcher
Darula, Radoslav	(MECH, AAU)	Academic co-worker
Davoudinejad, Ali	(MEK-MPP)	Postdoc
De Baere, David	(MEK-MPP)	PhD student
De Chiffre, Leonardo	(MEK-MPP)	Professor
Deininger, Michael	(MEK-K&P)	Associate Professor
Desai, Nishith Babubhai	(MEK-TES)	Postdoc
Dhar, Somrita	(WIND)	PhD student
Dias, Marcelo	(ENG, AU)	Assistant Professor
Didone, Mattia	(MEK-MPP)	PhD student
Dilgen, Cetin	(MEK-FAM)	PhD student
Dimitrov, Nikolai	(WIND)	Senior Researcher
Doagou-Rad, Saeed	(MEK-MPP)	PhD student
Drozdov, Aleksey	(MECH, AAU)	Professor
Dzialo, Christine Mary	(MECH, AAU)	PhD student
Eder, Martin Alexander	(WIND)	Senior Researcher
Eifler, Tobias	(MEK-K&P)	Assistant Professor
Elmegaard, Brian	(MEK-TES)	Professor, Head of Section
Eltard-Larsen, Bjarke	(MEK-FVM)	Postdoc
Endelt, Benny Ørtoft	(MECH, AAU)	Associate Professor
Engsig-Karup, Allan	(COMPUTE)	Associate Professor
Eriksen, Rasmus Normann Wilken	(MEK-FAM)	Postdoc
Eriksen, Stig	(SDU-ITI)	PhD student
Erlandsson, Anders Christiansen	(MEK-TES)	Professor
Evgrafov, Anton	(MEK-FAM)	Senior Researcher
Faber, Michael Havbro	(CIVIL, AAU)	Professor
Fajstrup, Lisbeth	(MATH, AAU)	Associate Professor
Farshidi, Arash	(MEK-FAM)	Scientific Assistant
Fedorova, Irina	(MEK-MTU)	PhD student
Feng, Ju	(WIND)	Postdoc
Ferrari, Federico	(MEK-FAM)	Postdoc

Ferruzza, Davide	(MEK-TES)	PhD student
Filsoof, Oliver Tierdad	(ENG, AU)	PhD student
Fisker, Ann-Sofie	(COMPUTE)	PhD student
Foldager, Frederik	(ENG, AU)	PhD student
Frausing, Rasmus	(MEK-TES)	Scientific Assistant
Fredsøe, Jørgen	(MEK-FVM)	Professor Emeritus
Frier, Christian	(CIVIL, AAU)	Associate Professor, PhD
Fuentes, Valentin Salgado	(MEK-TES)	Scientific Assistant
Fuhrman, David R.	(MEK-FVM)	Associate Professor
Funch, Cecilie Vase	(MEK-MTU)	Scientific Assistant
Gani, Michael	(MEK-FAM)	Scientific Assistant
Garcia, Néstor Ramos	(WIND)	Researcher
Garde, Henrik	(MATH, AAU)	Assistant Professor
Geiselhart, Matthias	(MEK-TES)	PhD student
Georgakis, Christos T.	(ENG, AU)	Professor
Gervang, Bo	(ENG, AU)	Associate Professor
Ghadirian, Amin	(WIND)	PhD student
Giannekas, Nikolaos	(MEK-MPP)	PhD student
Gisladottir, Arnthrudur	(ENG, AU)	PhD student
Gotfredsen, Erik	(MEK-FVM)	Scientific Assistant
Goutianos, Stergio	(WIND)	Senior Scientist
Graeme, Keith		Elected member
Gravesen, Jens	(COMPUTE)	Associate Professor, dr.phil
Greiner, Martin	(ENG, AU)	Professor
Groen, Jeroen Peter	(MEK-FAM)	PhD student
Gupta, Shivangi	(MEK-MTU)	PhD student
Gunneskov, Ole		Elected member, PhD.
Hagdrup, Morten	(COMPUTE)	PhD student
Haglind, Fredrik	(MEK-TES)	Associate Professor
Hald, John	(MEK-MTU)	Professor
Halkjær, Søren		Elected member, PhD
Han, Anpan	(MEK-MPP)	Senior Researcher
Hansen, Claus Thorp	(MEK-K&P)	Associate Professor
Hansen, Hans Nørgaard	(MEK-ADM)	Professor, Head of Department
Hansen, Kurt Schaldemose	(WIND)	Senior Researcher
Hansen, Martin Otto Laver	(WIND)	Associate Professor
Hansen, Mette Sanne	(MEK-FVM)	Senior Researcher
Haratian, Saber	(MEK-MTU)	PhD student
Hartz, Benjamin Arnold Krekeler	(MEK-TES)	Scientific Assistant
Hasannasabjaldehbakhani, Marzieh	(COMPUTE)	PhD student
Haselbach, Philipp	(WIND)	Researcher
Hassing, Henrik		Elected member, PhD
Hattel, Jesper Henri	(MEK-MPP)	Professor
Heide-Jørgensen, Simon	(ENG, AU)	PhD student
Henriksen, Christian	(COMPUTE)	Associate Professor, PhD
Hicks, Jacob Bjarke Hansen	(MEK-FVM)	PhD student
Hjorth, Poul	(COMPUTE)	Associate Professor, PhD
Hodzic, Azur	(MEK-FVM)	PhD student
Hoffmeyer, David	(MEK-FAM)	PhD student
Hofstätter, Thomas	(MEK-MPP)	PhD student
Holte, Ingrid	(MEK-FAM)	PhD student
Holmsgaard, Rikke	(CIVIL, AAU)	Assistant Professor
Hong, Chuanshi	(MEK-MTU)	Senior Researcher
Hosseiny, Seyed Aydin Raeis	(MECH, AAU)	PhD student
Howard, Thomas J.	(MEK-K&P)	Associate Professor
Huang, Xiaoxu	(MEK-MTU)	Senior Researcher
Hvidt, Victor	(MEK-MTU)	Scientific Assistant

Høeg, Christian Elkjær	(ENG-AU)	PhD student
Høgsberg, Jan Becker	(MEK-FAM)	Associate Professor
Højfeldt, Nicolas Kjær	(MEK-FAM)	Scientific Assistant
Højsgaard, Søren	(MATH, AAU)	Associate Professor, head of department
Ibsen, Lars Bo	(CIVIL, AAU)	Professor, PhD
Imran, Muhammad	(MEK-TES)	Postdoc
Islam, Mohammad Aminul	(MEK-MPP)	Associate Professor
Ivarsson, Anders	(MEK-TES)	Associate Professor
Jabbarinehnam, Mirmasoud	(MEK-MPP)	Researcher
Jacobsen, Christian Brix		Elected member, PhD.
Jakobsen, Christian S.		Elected member, R&D Engineer
Jakobsen, Johnny	(MECH, AAU)	Associate Professor
Jakobsen, Lasse	(MEK-MPP)	Scientific Assistant
Jellesen, Morten Stendahl	(MEK-MTU)	Senior Researcher
Jensen, Dorte Juul	(MEK-MPP)	Professor
Jensen, Erik Appel	(MECH, AAU)	Associate Professor
Jensen, Henrik Myhre	(ENG, AU)	Professor
Jensen, Jakob Søndergaard	(MEK-FAM)	Professor MSO, PhD
Jensen, Jonas Kjær	(MEK-TES)	Researcher
Jensen, Jørgen Juncher	(MEK-FVM)	Professor Emeritus, dr. techn.
Jensen, Lars Rosgaard	(MECH, AAU)	Associate Professor
Jensen, Lasse Skovgaard	(MEK-K&P)	Scientific Assistant
Jensen, Mathias Laustsen	(MEK-MPP)	Scientific Assistant
Jensen, Michael Vincent	(MEK-TES)	Postdoc
Jensen, Stina Rask	(ENG, AU)	PhD student
Jespersen, Mads Carsten	(MEK-TES)	PhD student
Jia, Beizhen	(MECH, AAU)	PhD student
Johansen, Nicolai Frost-Jensen	(MEK-MTU)	PhD student
Junker, Rune Grønborg	(COMPUTE)	PhD student
Jurado, Antonio	(WIND)	PhD student
Juul, Kristian Jørgensen	(MEK-FAM)	Postdoc
Juul, Nicolai Ytterdal	(MEK-MTU)	Postdoc
Jönsson, Jeppe	(CIVIL)	Professor
Jørgensen, John Bagterp	(COMPUTE)	Associate Professor
Jørgensen, Pernille Hartmund	(MEK-TES)	PhD student
Kappatos, Vasileios	(SDU-ITI)	Associate Professor
Karamehmedovic, Mirza	(COMPUTE)	Associate Professor
Kepler, Jørgen	(MECH, AAU)	Associate Professor
Kermani, Nasrin Arjomand	(MEK_TES)	Postdoc
Kiefer, Janik	(WIND)	PhD student
Kim, Taesong	(WIND)	Associate Professor
Kirkegaard, Poul Henning	(ENG, AU)	Professor
Kjeld, Jonas Gad	(SDU-ITI)	PhD student
Kjemtrup, Lars	(MEK-TES)	PhD student
Klahn, Mathias	(MEK-FVM)	PhD student
Klingaa, Christopher Gottlieb	(MEK-MPP)	PhD student
Klit, Peder	(MEK-FAM)	Professor, PhD
Knudsen, Kim	(COMPUTE)	Associate professor
Knudsen, Thomas S.		Elected member, PhD.
Kofler, René	(MEK-TES)	Scientific Assistant
Koss, Holger	(CIVIL)	Associate Professor
Kozarcanin, Smail	(ENG, AU)	PhD student
Kravchenko, Mariia	(MEK-K&P)	PhD student
Krenk, Steen	(MEK-FAM)	Professor Emeritus, dr.techn.
Kristensen, Anders Schmidt	(CIVIL, AAU)	Associate Professor
Kristiansen, Kristian Uldall	(COMPUTE)	Associate Professor
Krogh, Christian	(MECH, AAU)	PhD student

Kværndrup, Frederik Bojsen	(MEK-MTU)	PhD student
Kücükyildiz, Ömer Can	(MEK-MPP)	PhD student
Kærn, Martin Ryhl	(MEK-TES)	Senior researcher
Laganà, Simone	(MEK-MTU)	Postdoc
Lambertsen, Søren Heide	(CIVIL, AAU)	Associate Professor
Larsen, Jan Balle		Elected member, PhD.
Larsen, Poul Scheel	(MEK-FVM)	Professor Emeritus, PhD
Larsen, Raino Mikael	(MECH, AAU)	Associate Professor
Lauser, Simone	(MEK-MTU)	PhD student
Ledet, Lasse Søgaard	(MECH, AAU)	PhD student
Lee, Seunghwan	(MEK-MTU)	Associate Professor
Legarth, Brian N.	(MEK-FAM)	Associate Professor, PhD
Lemvig, Jakob	(COMPUTE)	Associate Professor
Lenau, Torben Anker	(MEK-K&P)	Associate Professor
Li, Dongya	(MEK-MPP)	PhD student
Li, Feng	(MEK-MTU)	PhD student
Liisberg, Jon Anders Reichert	(COMPUTE)	PhD student
Lilholt, Hans	(WIND)	Chief Scientist
Liljenhjerte, Johannes	(ENG, AU)	PhD student
Limkilde, Asger	(COMPUTE)	PhD student
Lindgaard, Esben	(MECH, AAU)	Associate Professor
Lind-Nielsen, Birger		Elected member, PhD.
Liu, Hailiang	(ENG, AU)	PhD student
Loaldi, Dario	(MEK-MPP)	PhD student
Luczak, Martin M.	(WIND)	Senior Researcher
Lund, Erik	(MECH, AAU)	Professor, PhD
Lund, Ivar	(SDU-ITI)	Associate Professor
Lundgaard, Christian	(MEK-FAM)	Postdoc
Lundgaard, Rasmus	(MEK-K&P)	PhD student
Lynggaard, Julie	(MEK-FAM)	PhD student
Lützen, Marie	(SDU-ITI)	Associate Professor
Løkkegaard, Martin	(MEK-K&P)	PhD student
Madsen, Emil	(ENG, AU)	PhD student
Madsen, Freddy	(WIND)	PhD student
Madsen, Per A.	(MEK-FVM)	Professor, dr.techn.
Madsen, Stine Skov	(MEK-FAM)	Postdoc
Madsen, Søren Peder	(ENG, AU)	Associate Professor
Maduro, Marco Aurelio Miranda	(WIND)	PhD student
Mahdi, Abkar	(ENG, AU)	Assistant Professor
Mahshid, Rasoul	(MEK-MPP)	PhD student
Malede, Yohanes Chekol	(MEK-MTU)	PhD student
Mancini, Roberta	(MEK-TES)	PhD student
Manouchehr, Mehrtash	(MEK-FAM)	Scientific Assistant
Markussen, Wiebke Brix	(MEK-TES)	Associate Professor
Markvorsen, Steen	(COMPUTE)	Professor, dr. techn., PhD
Marti, Ignacio	(WIND)	Head of Section
McAloone, Tim C.	(MEK-K&P)	Professor MSO
Meng, Yichen	(MEK-MTU)	PhD student
Meesenburg, Wiebke	(MEK-TES)	PhD student
Meyer, Knud Erik	(MEK-FVM)	Associate Professor, PhD
Mikkelsen, Henrik	UMEK-FVM)	PhD student
Mikkelsen, Lars Pilgaard	(WIND)	Associate Professor
Mikkelsen, Robert Flemming	(WIND)	Senior Researcher
Mishin, Oleg V.	(MEK-MTU)	Senior Researcher
Mishnaevsky, Leon	(WIND)	Senior Scientist, Dr.-ing.habil
Moghadam, Marcel	(MEK-MPP)	PhD student
Mohanty, Sankhya	(MEK-MPP)	Postdoc

Moncy, Aakash	(MEK-FAM)	PhD student
Montagud, Maria Engracia Mondejar	(MEK-TES)	Researcher
Montgomery, Melanie	(MEK-MTU)	Senior Researcher
Mortensen, Niels Henrik	(MEK-K&P)	Professor, Head of Section
Mortensen, Ulrich Andreas	(WIND)	PhD student
Müller, Georg Otto	(MEK-K&P)	Scientific Assistant
Møller, Jesper	(MATH, AAU)	Professor
Møller, Per	(MEK-ADM)	Professor
Møller, Randi Nøhr	(MEK-FAM)	PhD student
Nadimpalli, Venkata Karthik	(MEK-MPP)	Postdoc
Natarajan, Anand	(WIND)	Senior Researcher
Nguyen, Tuong-Van	(MEK-TES)	Researcher
Nielsen, Anne Ryelund	(COMPUTE)	PhD student
Nielsen, Benjamin N.	(CIVIL, AAU)	Associate Professor
Nielsen, Chris Valentin	(MEK-MPP)	Associate Professor
Nielsen, Jacob Obitsø	(MEK-MTU)	PhD student
Nielsen, Jens Henrik	(CIVIL)	Assistant Professor
Nielsen, Kamilla Haahr	(COMPUTE)	PhD student
Nielsen, Kim Lau	(MEK-FAM)	Associate Professor
Nielsen, Leif Otto	(CIVIL)	Associate Prof. Emeritus
Nielsen, Morten	(MATH, AAU)	Professor
Nielsen, Niels-Jørgen Rishøj		Elected member, PhD.
Nielsen, Søren Dam	(CIVIL, AAU)	Assistant Professor
Nielsen, Søren R.K.	(CIVIL, AAU)	Professor, dr. techn
Nielsen, Ulrik Dam	(MEK-FVM)	Associate Professor
Niordson, Christian F.	(MEK-FAM)	Associate Professor, PhD, Head of Section
Nygaard, Jens Vinge	(ENG, AU)	Head of Mechanical Engineering
Oest, Jacob	(MECH, AAU)	Postdoc
Ohlsen, Niels Lennart	(SDU-ITI)	Assistant Professor
Okulov, Valery	(WIND)	Senior Researcher
Olesen, Christian Gammelgaard	(MECH, AAU)	Associate Professor
Olesen, John Forbes	(CIVIL)	Associate Professor
Olhoff, Niels	(MECH, AAU)	Professor Emeritus
Ommen, Torben Schmidt	(MEK-TES)	Researcher
Overgaard, Hannibal Christian T.	(MEK-FAM)	PhD student
Pantleon, Karen	(MEK-MTU)	Associate Professor
Pantleon, Wolfgang	(MEK-MTU)	Professor MSO
Paulsen, Thomas Thougaard	(MEK-FAM)	Scientific Assistant
Pedersen, David Bue	(MEK-MPP)	Senior Researcher
Pedersen, Jesper Roland Kjærgaard	(MEK-FVM)	PhD student
Pedersen, Lars	(CIVIL, AAU)	Associate Professor
Pedersen, Mikkel Melters	(ENG, AU)	Assistant Professor
Pedersen, Michael	(COMPUTE)	Professor, dr.techn.
Pedersen, Niels L.	(MEK-FAM)	Associate Professor, dr.techn.
Pedersen, Pauli	(MEK-FAM)	Professor Emeritus, dr.techn., HD
Pedersen, Preben Terndrup	(MEK-FVM)	Professor Emeritus, PhD
Pedersen, Thomas Ørts		Elected member, PhD.
Peréz, Ignacio V.	(MEK-FAM)	PhD student
Perrild, Lærke Sofie Spaabæk	(MEK-K&P)	Scientific Assistant
Petersen, Henrik Gordon		Elected member, Professor
Petersen, Thomas		Elected member, PhD
Petersen, Steffen	(ENG, AU)	Associate Professor
Pieper, Henrik	(MEK-TES)	PhD student
Pieroni, Marina de Pádua Pinheiro	(MEK-K&P)	PhD student
Pigosso, Daniela Cristina Antelmi	(MEK-K&P)	Associate Professor
Piotrowska, Kamila	(MEK-MTU)	Postdoc

Poulios, Konstantinos	(MEK-FAM)	Researcher
Poulsen, Niels Kjølstad	(COMPUTE)	Associate Professor, PhD
Poulsen, Peter Noe	(CIVIL)	Associate Professor
Pyrz, Ryszard	(MECH, AAU)	Professor Emeritus
Quagliotti, Danilo	(MEK-MPP)	Postdoc
Raffaelli, Matteo	(COMPUTE)	PhD student
Rasmussen, Christoffer	(COMPUTE)	PhD student
Rasmussen, Filip Salling	(MEK-MPP)	PhD student
Rasmussen, Henrik K.	(MEK-MPP)	Associate Professor, PhD
Rasmussen, Jeppe Bredahl	(MEK-K&P)	PhD student
Rasmussen, John	(MECH, AAU)	Professor
Rasmussen, Morten Grud	(MATH, AAU)	Associate Professor
Rauhe, Jens Christian M	(MECH, AAU)	Associate Professor
Ravendran, Rathesan	(MECH, AAU)	PhD student
Ravn-Jensen, Kim		Elected members, PhD.
Read, Robert	(MEK-FVM)	Senior Researcher
Redanz, Pia		Elected member, Senior Engineer
Regener, Pelle Bo	(MEK-FVM)	Postdoc
Regi, Francesco	(MEK-MPP)	PhD student
Rezaei, Mohsen	(MEK-FAM)	Researcher
Ribo, Macarena Mendez	(MEK-MPP)	PhD student
Ringgaard, Kasper	(ENG, AU)	PhD student
Richelsen, Ann Bettina	(MEK-FAM)	Professor, PhD
Rizzo, Riccardo	(MEK-MTU)	PhD student
Rogie, Brice Lucien Maurice	(MEK-TES)	Postdoc
Rokni, Masoud	(MEK-TES)	Associate Professor
Rong, Li	(ENG, AU)	Assistant Professor
Rootzén, Helle	(COMPUTE)	Professor
Rosbjerg, Dan		Elected members, Professor, dr.techn.
Rosenkilde, Johan S. H.	(COMPUTE)	Assistant Professor
Rothuizen, Erasmus Damgaard	(MEK-TES)	Researcher
Rubak, Ege	(MATH, AAU)	Associate Professor
Ruhoff, Peder Thusgaard	(SDU-ITI)	Head of department, Professor
Runge, Kristoffer Jakob Solchenbach	(MEK-MPP)	Scientific Assistant
Røgen, Peter	(COMPUTE)	Associate Professor, PhD
Sabbadin, Pietro	(MEK-FAM)	PhD student
Saettone, Simone	(MEK-FVM)	PhD student
Sah, Si Mohamed	(MEK-FAM)	Postdoc
Sanporean, Catalina-Gabriela	(MECH, AAU)	Associate Professor
Sandberg, Michael	(MEK-MPP)	PhD student
Santos, Ilmar F.	(MEK-FAM)	Professor, Dr.-Ing.
Sarhadi, Ali	(WIND)	Researcher
Sessarego, Matias	(WIND)	PhD student
Saxena, Prateek	(MEK-MPP)	Scientific Assistant
Schjødt-Thomsen, Jan	(MECH, AAU)	Associate Professor
Schmidt, Dorte S.	(SDU-ITI)	Associate Professor
Schmiegel, Jürgen	(ENG, AU)	Associate Professor
Schramm, Jesper	(MEK-TES)	Professor MSO
Serdeczny, Marcin Piotr	(MEK-MPP)	PhD student
Shafiee, Sara	(MEK-K&P)	Postdoc
Shakibfar, Saeed	(SDU-ITI)	Postdoc
Shao, Yanlin	(MEK-FVM)	Associate Professor
Shen, Wen Zhong	(WIND)	Professor
Sigmund, Ole	(MEK-FAM)	Professor, dr.techn.
Sigurjonsson, Hafthor Ægir	(MEK-TES)	Postdoc
Sigsgaard, Kristoffer Vandrup	(MEK-K&P)	PhD student
Sivebæk, Ion Marius	(MEK-MPP)	Associate Professor, PhD

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Svenningsgaard, Jon	(MECH, AAU)	PhD student
Svensen, Jan	(COMPUTE	PhD student
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Sørensen, Jens Nørkær	(WIND)	Professor
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