DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

ANNUAL REPORT
2022

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

DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

Scientific Council as of March 2023

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Niels Leergaard Pedersen	Dept. of Civil and Mechanical Engineering, DTU
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Mads Peter Sørensen	Dept. of Applied Mathematics and Computer Science, DTU
Sine Leergaard Wiggers	Dept. of Mechanical and Electrical Engineering, SDU

Chairman

Associate Professor Niels Leergaard Pedersen

Department of Civil and Mechanical Engineering, Solid Mechanics.

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FOREWORD

This annual report is for the year 2022 The purpose of the report is 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 and universities.

After some years without much activity (Covid-19), the year 2022 was a very active year. In March 2022 the 18th bi-annual internal DCAMM Symposium took place at Steigenberger Alsik Hotel & Spa in Sønderborg with 93 participants. Thursday 10 November we had a half-day symposium with this years annual speaker seminar where we also celebrated the 100th anniversary of Frithiof Niordson. The annual speaker seminar was given by Professor George Em Karniadakis from Brown University under the title "*From Physics-Informed Machine Learning to Pysics-Informed Machine Intelligence: QUO VADIMUS*", three anniversary lectures were given by: Professor Peter Gudmundson from KTH, Royal Institute of Technology, Sweden, Professor Norman Fleck from University of Cambridge, UK and from the industry Technical Director Claus B.W. Pedersen from Dassault Systèmes, France.

Furthermore, a total of 12 DCAMM seminars were held in 2022 and 11 courses were given in the auspices of DCAMM. All the details are available at the DCAMM webpage.

As of March 1st 2023, the departments cooperating in DCAMM are:

from the **Technical University of Denmark**:
Department of Civil and Mechanical Engineering
Department of Applied Mathematics and Computer Science
Department of Wind and Energy Systems

from **Aalborg University**:
Department of the Built Environment (BUILD)
Department of Materials and Production
Department of Mathematical Sciences

from **Aarhus University**
Department of Civil and Architectural Engineering
Department of Mechanical and Production Engineering

from **University of Southern Denmark**
Department of Mechanical and Electrical Engineering

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

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1. MEMBERS 2022

63 professors
307 scientific members
177 PhD students
} at the nine cooperating departments at the Center

28 elected members
3 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

3. GUESTS FOR EXTENDED PERIODS IN 2022
(more than a fortnight)

Guest professors & post docs:

Datta, Mrinmoy, IIT Hyderabad, India, 13.6.22 – 3.7.22

Gaban, Renaud, Diabatix, Belgium, 30.5.22 – 29.6.22 & 1.11.22 – 19.12.22

Hassani, Behrooz, Ferdowsi University of Mashhad, Iran 20.1.22 – 30.6.22

El-Azab, Anter, Purdue University, USA, 1.3.22 – 15.5.22

Farahbakhsh, Iman, Amirkabir University of Technology, Iran, 1.7.22 – 1.10.22

Ghorpade, Sudhir, IIT Bombay, India, 13.6.22 – 4.7.22

Huo, Zhongyan, Zhejiang Ocean University, China, 1.5.22 – 31.10.22

Jin, Xiaoning, Northeastern University, USA, 15.8.22 – 31.12.22

Kanbur, Baris Burak, Nanyan Techn. University (NTU), Singapore, 26.1.22 – 31.3.22

Kim, Minjik Kim, KAIST University, Korea, 29.9.22 – 27.10.22

Kobayashi, Masakazu, Toyota Technological Institute, Japan, 2.8.22 – 1.11.22

Le, Hoa Thanh, China, 1.6.22 – 31.12.22

Liu, Zhezhao, Zhejiang University, China, 1.12.22 – 15.3.23

Marla, Deepak, University of Bombay, India, 18.6.22 – 30.6.22

Menez, Johanna, University of Bern, Switzerland, 15.4.22 – 30.9.22

Mesbah, Moustafa, Algeria, 15.6.22 – 17.3.23

Nie, Jiancheng, China, 1.10.22 – 30.11.22

Santamaria, Monica, Univ. Minho, Portugal, 1.4.22 – 1.8.22

Satari, Ramish, University of Leibniz, Germany, 25.8.22 – 30.9.22

Seidel, Alexander, Technical University of Munich, Germany, 24.8.22 – 24.2.23

Stoltz, Robert, University of Virgin Islands (US territory), 1.2.22 – 1.6.22

Türk, Seyfettin, Eskisehir Technical University, Turkey, 1.4.22 – 31.3.23

Vair, Federico, Politecnico di Torino, Italy, 19.4.22 – 19.7.22

Waimann, Johanna, RWTH Aachen University, Germany, 22.8.22 – 16.9.22

Wolfs, Robert J. M., Eindhoven University, The Netherlands, 11.9.22 – 7.10.22

Wyller, John A., Norwegian Univ. of Life Sciences (NMBU), Norway, 5.9.22 – 16.12.22

Xu, Shijie, Lund University, Sweden, 23.2.22 – 24.4.22

Zhang, Xiaojia (Shelly), Illinois University, USA, 30.11.22 – 20.12.22

Zöllner, Dana, Otto von Guericke University of Magdeburg, Germany, 7.3.22 – 8.4.22 & 29.8. – 30.9.22.

PhD students

Carlucci, Polytechnic University of Bari, Italy, 2.5.22 – 31.7.22

Chae, Yong Jae, KAIST, Korea, 1.10.22 – 31.1.23

Cool, Vanessa, KU Leuven, Belgium, 8.8.22 – 12.2.23

Fragnito, Andrea, University of Naples "Federico II", Italy, 1.10.22 – 31.3.22

Genovese, Gianluca, University of Alerno, Italy, 15.9.22 – 15.12.22

Ghasemi, Ali, Amirkabir University of Technology, Iran, 1.1.22 – 1.11.22

Guo, Jing, Chongqing University, 15.5.22 – 15.2.23

Kanikova, Kristina, Slovak University of Technology, Slovakia, 1.12.22 – 28.2.23

Kulkarni, Rohit, Ghent University, Belgium, 1.7.2 – 30.9.22

Liu, Zhuang, School of Astronautics, Harbin Inst. of Tech., China, 15.10.22 – 14.10.23

Ma, Huidong, Lanzhou University of Technology, China, 5.9.22 – 30.3.23

Machač, Martin, Czech Technical University (CTU), the Czech Republic

Moghadasi, Hesam, Iran University, Iran, 15.6.21 – 15.6.22

Mommeyer, Christiaan, KU Leuven, Belgium, 1.5.22 – 30.11.22

Movassagh-Alanagh, Farid, Tarbiat Modares University, Iran, 1.5.22 – 31.12.22

Navas, Javier Lopez, Hong Kong University, China, 1.9.21 – 28.2.22

Park, Jung Hwan, KAIST, Korea, 1.10.22 – 7.2.23

Pauls, Vitalii, Marche Polytechnic University, Italy, 28.3.22 – 29.6.22

Peitola, Joose, University of Eastern Finland, Finland, 12.9.22 – 30.11.22

Pendas-Recondo, Enrique, University of Murcia, Spain, 1.5.22 – 31.6.22

Peng, Zhao, China, 1.3.22 – 1.3.23

Poul, Magdalena, Technical University of Munich, Germany, 1.4.22 – 30.6.22

Riitama, Christian, Aalto University School of Engineering, Finland, 1.10.22 – 31.12.22

Rostamian, Faezeh, Isfahan University, Iran, 1.9.21 – 15.8.22

Song, Longlong, Northwestern Polytechnical University, China, 1.9.22 – 1.3.23

Su, Dongxu, Jiaotong University, China, 18.3.21 – 17.3.22

Vieren, Elias, Ghent University, Belgium, 1.8.22 – 31.10.22

Wang, Honghong, Xi'an University of Electronic Technology, China, 15.1.22 – 30.5.23

Wu, Jiani, Chinese Academy of Sciences, China, 20.10.22 – 20.10.23

Wu, Yutian, PtU – Technische Universität Darmstadt, Germany, 29.5.22 – 28.6.22

Xia, Hongjun, Nanjing University, China, 16.1.21 – 15.1.22

Xia, Yiping, Harbin Institute of Technology, China, 10.2.22 – 11.2.23

Xu, He, China University of Geosciences, China, 1.11.22 – 1.2.24

Yang, Fei, Southeast University, China, 16.12.21 – 30.12.22

Yang, Wenzhen, Jiangnan University, China, 1.11.21 – 31.10.22

Yang, Zhaoming, China, 1.10.22 – 1.10.23

Zhang, Zhaochang, School of Engineerng, Souteast University, China, 20.1.22 – 23.1.23

Zhu, Yanlong, Harbin Institute of Technology, P.R. China, 24.1.22 – 23.1.23

4. DCAMM SEMINARS GIVEN IN 2022

Topology Optimisation by Sequential Integer Linear Programming Applied to Multi-physics

Research Fellow Renato Picelli Sanchez
University of Sao Paulo, Brazil
held at DTU Civil and Mechanical Engineering 6 May 2022

Abstract:

For years, integer programming in topology optimisation was deemed intractable due to large computational expenses and inability to effectively handle constraint nonlinearities. However, this can now be reevaluated. This talk provides first a historic overview of the
methods employing binary design variables and then focuses on a topology optimisation framework based on sequential integer linear programming. Applications are given for coupled multi-physics problems in solid and fluid mechanics. The promising characteristics
of the overall framework will be illustrated with 2D and 3D problems, including acoustics, turbulent flow and fluid-structure interaction.

Topology optimisation for passive coolers in natural convection

by Assistant Professor Joe Alexandersen,
Department of Mechanical and Electrical Engineering,
University of Southern Denmark
held at DTU Civil and Mechanical Engineering 6 May 2022

Abstract:

This presentation will present an overview of topology optimisation for conjugate heat transfer problems. The focus will be on the developments by the presenter and co-workers on passive heat sinks cooled by natural convection. The presentation will cover everything from theoretical developments, numerical simulation to manufacture and experimental validation.

Exact macro-scale models for the design of compact heat transfer devices

by postdoc, Dr.ing. Geert Buckinx
1)Dept. of Mechanical Engineering, KU Leuven, Belgium
2) VITO, Mol, Belgium
3) Energy Ville, Genk, Belgium
held at DTU Civil and Mechanical Engineering 10 May 2022

Abstract:

Compact heat transfer devices often consist of channels with arrays of periodic solid structures, like offset strip fins, wavy fins or pin fins. For their design, simplified `macro-scale' models are commonly employed to analyze the flow and heat transfer. Typically, these macro-scale models rely on friction factors (or permeabilities) and heat transfer coefficients that have to be calibrated by means of real-life experiments or numerical simulations. Yet, from a theoretical perspective it is not always clear how a consistent calibration can be accomplished, especially since detailed measurements or full-scale simulations of the flow and temperature fields in a device are usually infeasible.
In this lecture, we discuss how physically meaningful friction factors and heat transfer coefficients can be defined for (quasi-) periodically developed flow and heat transfer regimes in micro heat exchangers. Hereto, we describe the flow and heat transfer on a macro-scale level,
by means of proper spatial filtering techniques. In addition, we show that for an exact calibration of the latter friction factors and heat
transfer coefficients, specific eigenvalue problems can be solved on a unit cell of the array. These eigenvalue problems allow us to reconstruct almost the entire flow and temperature fields in a micro heat exchanger. Finally, we offer a perspective on how our macro-
scale models can be combined with state-of-the-art shape and topology optimization methods to optimize the shape and distribution of the solid structures in compact heat transfer devices.

Manufacturing process optimization based on machine internal sensor data

by Prof. Dr. Alexander Mattes
Fachhochschule Kiel, University of Applied Sciences, Kiel, Germany
held at SDU, University of Southern Denmark 22 June 2022

Abstract:

Additive manufacturing, machining, welding and forming technologies are the fields of excellence of the research group Manufacturing Technology at the University of Applied Sciences Kiel. As part of the Institute for Production Technology (CIMTT) our research focus lies on the application of digital process optimization approaches. We will give an overview on our projects including in-process sensor data acquisition, data science and operator-centric analysis with user experience (UX).

Fractional power series and the method of dominant balances

by Professor C.J. Chapman
Keele University, United Kingdom

held at Aalborg University, Dept. of Mathematical Sciences, 30 August 2022

Abstract:

This talk describes a general treatment of the method of dominant balances for a polynomial equation, in which parameters are to be scaled in such a way that the maximum possible number of terms in the equation is in balance at leading order. This leads in general to a fractional power series (a `Puiseux series'), in which, surprisingly, there can be large and irregular gaps (lacunae) in the fractional powers actually occurring. A complete theory is given to determine the gaps, requiring the notion of a Frobenius set from number theory, and its complement, a Sylvester set. The talk is applied in outlook, as the method of dominant balances is widely used in physics and engineering, where it gives results of extraordinary accuracy, far beyond the expected range. The work has been conducted in a collaboration begun at the Isaac Newton Institute, Cambridge, with H. P. Wynn (London School of Economics). We believe the results are new. Despite hundreds of years of use of Puiseux series (since 1676), we are not aware of any previous attempt to give a complete quantitative account of their gaps.

The finite product method in approximation theory, and some applications

by Professor C.J. Chapman
Keele University, United Kingdom

held at Aarhus University, Dept. of Mechanical and Production Engineering,
1 September 2022

Abstract:

Many well-known functions in mathematics can be written as infinite products of simple factors. These include all the basic functions of trigonometry, of which Euler's infinite product for the sine is the best known. Unfortunately, truncations of these expressions to finite products are not normally of use, because of Runge's phenomenon, which is the presence of enormous unwanted oscillations near the boundaries of the domain of interest. In this talk, it will be shown that in a class of applied problems in wave propagation, these high-amplitude oscillations cancel out exactly, to leave an extremely useful family of finite-product approximations, whose high accuracy and range of validity are extraordinary. The talk includes a full account of Runge's phenomenon (for researchers new to the topic), a simple proof of the exact cancellation, using only Stirling's approximation to the Gamma Function (with the `one-twelfth correction'), and some examples of wave propagation in which the resulting finite-product approximations have been put to good use by the speaker and Professor S. V. Sorokin, Aalborg University.

Functionally graded materials by Laser Metal Deposition (Additive Manufacturing)

by Prof. Dr.Ing. Jana Schloesser
Fachhochschule Kiel, University of Applied Sciences, Kiel, Germany
held at SDU, University of Southern Denmark 29 August 2022

Abstract:

Additive manufacturing, machining, welding and forming technologies are the fields of excellence of the research group Manufacturing Technology at the University of Applied Sciences Kiel. As part of the Institute for Production Technology (CIMTT) our research focus lies on the application of digital process optimization approaches. We will give an overview on our projects including in-process sensor data acquisition, data science and operator-centric analysis with user experience (UX).

On some unusual phenomena and practical applications of parametrically excited systems

by Senior Lecturer Vladislav Sorokin
Dept. of Mechanical Engineering University of Auckland, New Zealand
held at DTU Civil and Mechanical Engineering 6 September 2022

Abstract:

In mechanical context, a system is typically referred to as parametrically excited when at least one of its parameters varies periodically either with time or a spatial coordinate. Such systems have been exploited in a wide range of applications from vibration suppression to energy harvesting and response amplification. First, several unusual phenomena arising in systems with time varying parameters will be briefly presented, such as gas bubble sinking and heavy particles rising in vibrating fluid-filled volumes. Then systems with spatially varying properties will be considered. Spatially periodic structures feature frequency bandgaps that are frequency rages in which travelling waves attenuate providing exceptional sound and vibration mitigation performance. A relatively simple approach to predict the locations and bandwidth of the frequency bandgaps for 1D and 2D periodic structures, such as beams and plates, will be presented. Then the effects of nonlinearity and disturbed periodicity, as well as quasi-periodicity, on the frequency bandgaps will be briefly discussed. Theoretical analysis and numerical results illustrating vibration attenuation performance of periodic "supercell" structures will be also presented.
Finally, results of experimental testing of large-scale (2.4m by 1m) plates will be discussed showing benefits of using structural variations and related wave scattering phenomena for attenuating vibrations.

Structural morphing induced by functionalising buckling

by Professor Kim J.R. Rasmussen
University of Sydney, Australia, Otto Mønsted Guest Professor
held at DTU Civil and Mechanical Engineering 23 November 2022

Abstract:

The lecture presents an overview of a recent research project at the University of Sydney aimed at developing a general framework for the analysis and design of functional components of buildings and structures, where such components achieve large shape changes (morphing) via buckling. The shape changes are optimised, e.g. to reduce energy consumption by minimising solar radiation loads or maximising natural air ventilation. The underlying driver for the project is to develop innovative building technology solutions to reduce the energy consumption for future generations of low-, medium- and high-rise buildings.

The lecture first summarises work on optimising the topology of plates to maximise their shading or ventilation capacities under applied compression or bending. Considering both buckling and nonlinear post-buckling, the analytical framework optimises the spatial distribution of plate thickness. Experiments on optimised plates are reported as well, in which shape memory alloy (SMA) and piezoelectric (PZT) actuators are used to induce compression and buckling. Work on plate elements supported along three edges is also described, in which temporary intermediate restraints are used to load the plate into the post-buckling range and subsequently released to generate abrupt shape change following an external signal triggered by shading or ventilation demand. Morphing induced by flexural-torsional buckling is described where simple frame geometries are devised to maximise the lateral buckling displacement and twist rotation under low-power external excitation, suitable for integration in façade construction as self-contained shading modules. The lecture concludes with demonstrating the use of snap-through buckling to produce bi-stable mechanisms with potential applications as shading and ventilation modules in double-skin façades, and as solutions for latching or deploying space equipment such as deployable solar arrays.

Digitizing Weld Quality Assurance of Welded Structures Subjected to Fatigue Loading – Towards Industry 4.0

by Professor Zuheir Barsoum
KTH Royal Institute of Technology, Stockholm, Sweden
held at SDU University of Southern Denmark 1 December 2022

Abstract:

The current study presents a comprehensive overview of weld quality control and assurance of welded structures where the major failure prevention is due to fatigue loading. It gives the drawbacks and limitation of quality control systems, international weld quality standards, and guidelines used in today's weld production. Furthermore, in recent development in quality control and assurance of welded structures, a new online method is presented. The main target is to enable a complete, online evaluation of large quantities of welds in an accurate and repeatable fashion. Information gathered will not only be used for determining the weld quality level with respect to the fatigue strength but also to be evaluated for use in improved process control, in welding power sources, and robot control systems. It is verified that the new online method, a new laser scanning technology, and algorithms can successfully be used as modern tools for automated unbiased geometrical weld quality assurance and implemented in weld production environment. Today, the system is commercialized and successfully implemented in several manufacturing site, mainly within the automotive and heavy industry.

Fatigue assessment of welded joints with the notch stress approach – Background and current developments

by Dr.-Ing. Jörg Baumgartner
Fraunhofer LBF, Germany
held at SDU University of Southern Denmark, 2 December 2022

Abstract:

The fatigue assessment of welded joints based on local approaches is gaining more and more importance in industrial use. The advantages of these approaches are that the detailed shape of the welds, an important key factor for weld quality, can be considered in the assessment.
In the first part of the presentation, the history and theoretical background of the effective notch stress approach with notch radius of 1 mm will be summarized. In the second part, further developments will be shown: first, the reference radius approach that works with reference radii smaller than 1 mm will be introduced, typically used for the assessment of welded thin sheets, second, the effective stress approach will be explained that relies on the direct application of the stress averaging approach according to Neuber or the critical distance approach according to Moore, Pederson and Taylor. In the third part, recent and upcoming implementations of the approaches in rules and guidelines are shown.

Inverse design and physical realization of mechanical and magnetic metastructres with programmable nonlinear responses

by Assistant Professor X. Shelly Zhang
Dept. of Civil and Environment Enginnering (CEE), Dept. of Mechanical Science and Engineering (MechSE), University of Illinois at Urbana-Champaign, USA

held at DTU Civil and Mechanical Engineering, 13 December 2022

Abstract:

The rational design and realization of programmable materials and structures play important roles in enabling functional devices, such as actuators, sensors, and robotics. Yet, the use of heuristically developed structural patterns could lead to restricted design space and potential failure to achieve specific target behaviors.

This talk will first introduce a topology optimization approach to inverse design soft mechanical metastructures, which are precisely programmed with a variety of extreme yet function-oriented responses under large deformations. The synthesized metastructures exhibit organic geometries and motions with irregular distribution of different material phases. Within the structure, different hyperelastic materials play distinct roles yet seamlessly collaborate through sophisticated deformation mechanisms. In addition, the properties of metamaterials and metastructures typically remain fixed after being designed. To enable reprogrammable behaviors, we introduce a magneto-mechanical topology optimization approach to generate magnetic metamaterials with responses that can be altered by external magnetic fields. The obtained magnetic metastructures exhibit one response under purely mechanical loading, and switch to a distinct response under simultaneous mechanical and applied magnetic fields.

With proposed optimization frameworks and hybrid fabrication, we design and fabricate a library of mechanical and magnetic metastructures that realize a wide range of precisely programmed nonlinear responses, including multi-plateau, switchable deformation, and adaptable snap buckling. These switchable yet programmable mechanical responses are enabled by the interactions among unique geometry, large deformations, and magnetic actuation (when applicable). The proposed optimization-driven computational design strategies can be utilized to design and realize multi-functional devices in various applications.

5. DCAMM ANNUAL SEMINAR SPEAKER 2022

The DCAMM Annual Seminar Speaker was this year given by Professor George Em Karniadakis from Brown University.
The seminar was given at DTU Thursday 10 November in connection with the 100th anniversary of Frithiof Niordson – see next pages

From Physics-Informed Machine Learning to Physics-Informed Machine Intelligence: QUO VADIMUS

Abstract:

We will review physics-informed neural networks (NNs) and summarize available extensions for applications in computational mechanics and beyond. We will also introduce new NNs that learn functionals and nonlinear operators from functions and corresponding responses for system identification. The universal approximation theorem of operators is suggestive of the potential of NNs in learning from scattered data any continuous operator or complex system. We first generalize the theorem to deep neural networks, and subsequently we apply it to design a new composite NN with small generalization error, the deep operator network (DeepONet), consisting of a NN for encoding the discrete input function space (branch net) and another NN for encoding the domain of the output functions (trunk net). We demonstrate that DeepONet can learn various explicit operators, e.g., integrals, Laplace transforms and fractional Laplacians, as well as implicit operators that represent deterministic and stochastic differential equations. More generally, DeepOnet can learn multiscale operators spanning across many scales and trained by diverse sources of data simultaneously. Finally, we will present first results on the next generation of these architectures to biologically plausible designs based on spiking neural networks and Hebbian learning that are more efficient and closer to human intelligence.

In connection with the100th anniversary of Frithiof Niordson – 1 August 2022 -, who was the founder of DCAMM back in 1969, three special invited speakers held the following lectures

- Peter Gudmundson, Professor, Department of Engineering Mechanics KTH Royal Institute of Technology, Sweden

Length scales and perturbation solutions – application to plastic properties of particle reinforced materials

Perturbation analysis is a powerful tool to obtain simplified solutions that still are sufficiently accurate. Simple cases and results from previous research will exemplify the methodology. As an example, the plastic properties of particle-reinforced materials are analyzed in more detail. It is assumed that the volume fraction is small and that the reinforcing particles are so small that length scale effects of plastic deformation in the matrix must be considered. A strain gradient plasticity theory is applied in order to capture these effects. The theory includes a material length scale ℓ, that can be compared to the particle radii a. Perturbation based solutions are derived for the case $a/\ell \ll 1$ and for strain hardening also for the case $\ell/a \ll 1$. The so obtained closed form solutions for initial yield stress, strain hardening and cyclic plasticity are compared to extensive finite element simulations and to experiments. Excellent agreements to finite element solutions are found for $a/\ell \ll 1$. It is also found that the perturbation based solutions give quite accurate predictions for ℓ/a of the order of one and that the model very well can capture experimental observations.

- Norman Fleck, Professor, Department of Engineering, University of Cambridge, United Kingdom

The mechanics of the cathode of a Li ion battery

Li ion batteries discharge by the transport of Li ions from an anode (such as graphite or Li metal) to a cathode comprising ceramic particles that swell upon lithiation. The next generation of batteries comprise cathode particles in the form of single crystals made from layered nickel rich materials. Recently, optical microscopy has been performed that reveal the diffusion of Li within these single crystals ("Operando visualisation of kinetically-induced lithium heterogeneities in single-particle layered Ni-rich cathodes" by Chao Xu, Alice J. Merryweather, Shrinidhi S. Pandurangi, Zhengyan Lun, David S. Hall, Vikram S. Deshpande, Norman A. Fleck, Christoph Schnedermann, Akshay Rao, Clare P. Grey, Joule 6, pp. 1-12, 2022.) This allows for a direct comparison with a fully coupled chemo-mechanical model of Li diffusion, including the role of stress. Predictions reveals that the level of induced stress in the single crystals is sufficient to induce cracking when the particles are large and the rate of discharge (lithiation) is very fast (full battery discharge in 10 minutes). Additional simulations have also been performed to explore whether a micro-architectured cathode can be designed that does not swell at the macroscopic level despite significant swelling by the active material upon lithiation.

- Claus B.W. Pedersen, Technical Director, Dassault Systèmes, France

Industrial Applications - Shell Models and Optimization Workflows
Due to sustainability, the Transport and Mobility (T&M) sector has started a transformation from conventional Fossil based systems to Electric Vehicles (EVs). Thus, we suggest to apply CAE workflows including shell modeling and non-parametric optimization approaches based upon adjoint sensitivities for addressing the challenges for deriving new and improved designs.
Initially, we show the mass minimization of a suspension component considering stiffness, strength and dynamic properties. The applied End-to-End optimization workflow includes automated CAD-reconstruction, concept variants for manufacturing constraints and additive manufacturing verification using a coupled thermal-stress process simulation considering continuously evolving convection and radiation surfaces during the manufacturing process.
Secondly, we construct a parametric skateboard shell model of the EV including the battery simulations applied to crash scenarios. Shell models are also applied to non-parametric crashworthiness bead and sizing optimization of the sheets for minimizing intrusions and head accelerations. Additionally, strength shell optimization is tackled using semi-analytic adjoint sensitivity analysis for non-proportional fatigue damage.
To conclude, we apply multiphysics modeling for optimizing the electrical machines of the EV drive train system having a major impact on the performance and overall comfort of the EVs.
Consequently, the present implemented modeling and optimization technologies can drive the T&M designs of the sustainable transformation.

7. LIST OF DCAMM S-REPORTS

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)

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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)

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

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

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

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S173. JOHANSEN, VILLADS EGEDE: Structural colours and applications to anodized aluminium surfaces (November 2014)
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S178. INGVORSEN, KRISTIAN MARK: Investigations of the turbulent swirling flow in a two-stroke marine diesel engine (November 2013)

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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)

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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)

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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)

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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)

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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)

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

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

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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)

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

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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)

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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)

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

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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)

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S255. BJARKLEV, KRISTIAN: Mode of Action-Based Variation Risk Identification (December 2018)

S256. JENSEN, LASSE SKOVGAARD: Design by Prototypin in Hardware Start-ups (October 2018)

S257. FERRUZZA, DAVIDE: Design of steam generator systems for concentrating solar power plants (October 2018)

S258. MIRSADRAEE, YASAMAN: Development of a Model for Propeller Tip Vortex Caviation and Analysis of the Radiated Pressure Fluctuations (September 2018)

S259. KARVOUNIS, NIKOLAS: Numerical Simulation of The Hydrodynamic Behavior of the Lubricant Oil Film in Large Two-stroke Marine Diesel Engines (October 2018)

S260. MANOUCHEHR MEHRTASH: Composite Materials for Electrical Transmission Mast Structures (February 2019)

S261. ZÜHLSDORF, BENJAMIN: High-performance heat pump systems. Enhancing performance and range of heat pump systems for industry and district heating (May 2019)

S262. YAACOB, MOHD RUSDY BIN: State-of-the-art laser Doppler systems development for turbulence measurements (June 2019)

S263. HOFFMEYER, DAVID: Damping of Torsional Beam Vibrations (August 2019)

S264. MØLLER, RANDI NØHR: Aerodynamic Stabilit of Long Span Bridges (June 2018)

S265. LUKASSEN, TROELS VESTERGAARD: Constitutive Behavior of Tensile Armor Wires in Unbounded Flexible Pipes (February 2019)

S266. ASADZADEH, SEYED SAEED: Numerical and experimental study of flow in choanoglagellates and choanocytes (August 2019)

S267. GOTFREDSEN, ERIK: Flow Phenomena in Selective Catalytic Reduction Systems used in Large Two-stroke Marine Diesel Engines (November 2018)

S268. MANCINI, ROBERTA: Design and Performance Analysis of Plate Heat Exchangers for Heat Pumps using Pure and Mixed Refrigerants (May 2019)

S269. TOFTEKÆR, JOHAN FREDERIK: Resonant Piezoelectric Shunt Damping of Structures (September 2019)

S270. ANDERSEN, RASMUS GRAU: Advancing Numerical Simulation Tools for Ductile Fracture in Thin metal Plates (February 2020)
S271. BALDASSO, ENRICO: Evaluation of the prospects for waste heat recovery on board liquefied natural gas-fuelled ships (February 2020)

S272. DILGEN, CETIN BATUR: Optimization of multiphysics problems: transient vebroacoustic and thermal-fluid systems (March 2020)

S273. VON OSMANSKI, ALEXANDER SEBASTIAN: Modelling of Gas Foil Bearings Towards Controllable Operation Multi-domain Analysis (April 2020)

S274. PÉREZ, IGNACIO VIDAL: Through-Thickness Damage Timeline of Fiber Composites under Dynamic Loading (April 2020)

S275. RASMUSSEN, JEPPE BREDAHL: Operation and maintenance of prodct configuration systems in project-based small and medium-sized enterprises (March 2020)

S276. JOHANSEN, NICOLAI FROST-JENSEN: Test Methods for Evaluating Rain Erosion Performance of Wind Turbine Blade Leading Edge Protection Systems (April 2020)

S277. DE PÁDUA PINHEIRO PIERONE, MARINA: Circular Economy Business Modelling: Decoupling value creation from resource consumptions within manufacturing companies (June 2020)

S278. BRØNS, MARIE: Vibration-based Estimation of Bolt Tension (June 2020)

S279. PIEPER, HENRIK: Optimal Integration of District Cooling, Heat Sources and Heat Sinks (December 2019)

S280. MEESENBURG, WIEBKE: Heat pumps supplying district heating and ancillary services for the power system (January 2020)

S281: BUTERA, GIACOMO: Methanol production integrating biomass thermochemical conversion and solid oxide cells (August 2020)

S282: CONLAN-SMITH, CIAN: Aerodynamic and Aeroelastic Shape Optimization of Aircraft Wings (November 2020)

S283: KRAVCHENKO, MARIIA: Sustainability screening as a decision support for early stage circular economy development: Moving the sails of circular economy in the direction of sustainability (November 2020)

S284: HICKS, JACOB BJARKE HANSEN: Development of a high-order potential flow solver for nonlinear wavestructure interaction (December 2020)

S285: KRISTIANSEN, HANSOTTO: Topology optimization of transient problems with frictional contact and finite strain (December 2020)

S286: BERGAMINI, RICCARDO: Development of expeditous process integration methods for retrofit of non-energy-intesive industries (December 2020)
S287. AKSHØJ, CHRISTOFFER: Implementing modular product architectures in mid-sized companies (January 2021)

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S289. HOLTE, INGRID: Modelling of ductile failure over multiple scales (January 2021)

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S291. HEMMINGSEN, CASPER SCHYTTE: Optimizing Oil Production by Novel Technology Integration – Well Flow Modeling (July 2019)

S292. SAETTONE, SIMONE: Ship Propulsion Hydrodynamics in Wawes (November 2020)

S293. SVENDSEN, NICKLAS WERGE: Exploring multi-functionality in biologically-inspired design through systematic development of medical equipment supporting corneal transplantation research (March 2021)

S294. MONCY, AAKASH: Tunelling cracks incomposite laminates under planar biaxial strain controlled fatigue loading (April 2021)

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S300: SIGSGAARD, KRISTOFFER VANDRUP: Modularization in Maintenance – A New Paradigm (August 2021)

S301: SOMLÓ, KINGA: Micromechanics of 3D printed Metals (August 2021)

S302. XU, YAN: A high-order finite difference method with immersed-boundary treatment for fully nonlinear wave-structure interaction (August 2021)

S303: CHRISTENSEN, CARSTEN K.F.: Developing Modular Product and Process Architectures in Engineer To Order Companies (August 2021)
S304: MIKKELSEN, HENRIK: Numerical Study of Ship Performance in Calm Water and in Waves (December 2021)

S305: KHALID, WAQAS: Concurrent optimisation of a maintenance management process (October 2021)

S306: SABBADIN, PIETRO: Mode-III fracture characterization of composites (September 2020)

S307: GEISELHART, MATTHIAS: Design for manufacturing and characerization of small-scale turbomachinery impellers (August 2021)

S308: HANSEN, CAMILLA ARNDT: Designing by Prototyping: Strategic support for prototype-driven product development (November 2021)

S309: ZHANG, MIN: Large eddy simultion of soot formation and oxidation under engine-like conditions (December 2021)

S310: SALGADO FUENTES, VALENTIN: Design, modelling and simulation of compact ammonia chiller and heat pump units (January 2022)

S311: MÜLLER, GEORG OTTO: Modular Commissioing of Complex Products (January 2022)

S312: NERENST, TIM BRIX: A Coherent Approach to Virtual Assessments of Structural Robustness (February 2022)

S313: ZHAI, YANYAN: Detailed Analyses of Flow in Porous Media and around Cylindrical Structures (Febrary 2022)

S314: IKONOMAKIS, ANGELOS: Sensor Fusion to Drive Vessel Performance (March 2022)

S315: NEMATI, ARASH: Numerical Simulation of Combustion under Marine Engine Like Conditions (April 2022)

S316: GANI, MICHAEL: Multi-Physics Modelling of Wet Seals in Two-Phase Flow (June 2022)

S317: QWIST, JESPER ROLAND KJÆRGAARD: Investigation of finite volume methods for free surface flows with focus on the numerical description of the air-water interface (August 2022)

S318: VISHWAKARMA, VISHAL: Investigation of size effects and heterogeneity in ductile failure (August 2022)

S319: VESTERGÅRD, DANIEL: Design-Oriented Nonlinear Modeling of Reinforced Concrete Wall Structures for Numerical Limit State Analysis (September 2022)

8. OTHER THESES

ALCAYAGA ROMAN, LEONARDO ANDRES: “Large scale atmospheric structures in space-time over flat terrain”, DTU Wind, 2022, PhD Thesis.

ANDERSEN, ASGER GADE: “Surface Engineering of Aluminium Alloys for Prosthetics” DTU Construct, 2022, PhD Thesis.

BAHREBAR, SAJIAD: “Climatic Reliability of Electronics: “Prediction of PCB Failure under Humidity using Predictive Analytics” DTU Construct, 2022, PhD Thesis.

BANGARU, ASHISH KUMAR: “Early stage fatigue damage mechanisms in composite material used for wind turbine rotor bladesused for wind turbine rotor blades”, DTU WIND, 2022, PhD Thesis.

BAUNGAARD, MADS CHRISTIAN: “Turbulence modeling for wind turbine wakes in non-neutral and anisotophic condition”, DTU Wind, 2022, PhD Thesis.

BASSO, ALBERTO: “Powder Injection Moulding of Metal and Recycled Rubber – Process and Material Characteristics”, DTU Construct, 2022, PhD Thesis.

BEAUSON, JUSTINE: “End-of life wind turbine blades”, DTU Wind, 2022, PhD Thesis.

BENAKOPOULOS, THEOFANIS: “Optimization of the building heating system, to minimize temperature levels in district heating network”, DTU Construct, 2022, PhD Thesis.

BERNTSEN; JESPER: “Fault Detection of Rolling Element Bearings in a Full Scale Wind Turbine Test Bench”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

BIBBO, NIMAI D.: “Analytical Fatigue Life Assessment of a Full Scale Wind Turbine Test Bench”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

CEDERLØF, DAAN JONAS HOTTENTOT: “Enhanced Damage Tolerance of Composite Materials by Multiple Delamination”, DTU Wind, 2022, PhD Thesis.

DANIELAK, ANNA HALIN: “Design, Optimization and Production of Smart Surfaces by Additive Manufacturing for Medical Applications”, DTU Construct, 2022, PhD Thesis.

DICHOLKAR, ANTQRIKSH CHANDRASHEKHAR: “Framework for aerodynamic shape optimization applied to wind turbine airfoilsoptimization applied to wind turbine airfoils”, DTU Wind, 2022, PhD Thesis.

FUNCH, CECILIE VASE: “Characterization and Optimization of Microstructure and Performance of 3D Printed Matallic Components”, DTU Construct, 2022, PhD Thesis.

GALL, GUILLEM: “Efficient modelling of delamination growth under quasi-static and fatigue loading using the Gloating Node Method”, Aalborg University, Department of Materials and Production, 2022, PhD Thesis.

GULL, MUHAMMAD AHSAN: “Design and bio-mechanical evaluation of upper-body exoskeletons for physical assistance”, Aalborg University, Department of Materials and Production, 2022, PhD Thesis.

GUPTA, SHIVANGI: “Organic and eco-friendly corrosion inhibitors for sweet and sour conditions (Investigation of corrosion inhibition mechanisms using experimental and molecular modelling)”, DTU Construct, 2022, PhD Thesis.

HASSAN, HAFIZ MUHAMMAD ADEEL: “Analysis and Design Optimization of Latent Heat Thermal Energy Storage System based on Phase Change Material Climate Modules”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

HUANG, TAO: “Chilling effects of ventilation and cooling strategies to cool the sows in hot climate (Cevcsc), Aarhus University, Dept. of Civil and Architectural Engineering, 2022, PhD Thesis.

JELICIC, GORAN: “System Identification of Parameter-Varying Aeroelastic Systems using Real-Time Operational Modal Analysis”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

JENSEN, ADAM RASMUS: “Concentrating Solar Collectors for District Heating Applications”, DTU Construct, 2022, PhD Thesis.

JENSEN, STINE RASK: “Energy renovation of dwellings – added value through architectural transformation”, Aarhus University, Dept. of Civil and Architectural Engineering, 2022, PhD Thesis.

KAPOOR, MEDHA: “Optimal Structural Health Information approaches for the efficient classification and management of structural systems”, DTU Construct, 2022, PhD Thesis.

KHAN, DANIYAL: “Analysis of Heated Urea Water Solution Droplets for Selective Catalytic Reduction Systems”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

KJELD, JONAS GAD: “Methodology for Determination of Vibration Damping of an Offshore Wind Turbine Supporting Structure”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

KRUSAA, MARIE RUGHOLM: “Self-regulating integrated ceiling solutions for heating, cooling, ventilation and acoustics in low energy building”, DTU Construct, 2022, PhD Thesis.

KUMAR, RAJNISH: “Characterisation and micromechanical predictions addressing tensile properties predictions addressing tensile properties of pultruded carbon fibre composites”, DTU Wind, 2022, PhD Thesis.

KÖRKEL, ANDREAS F. KIELSHOLM: “Surface engineering of titanium and titanium alloys for dental supplication”, DTU Construct, 2022, PhD Thesis.

LARSEN, MIKKEL LØVENSKJOLD: “Studies in the Fatigue Lives of Offshore Welded Joints Considering Non-Proportionality and Stochastic Effects”, University of Southern Denmark, Department of Mechanical and Electrical Engineering, 2022, PhD Thesis.

LINDKVIST, ADAM ALEXANDER: “3D mapping of local residual stresses using laboratory X-rays”, DTU Construct, PhD Thesis.

LINDSKOU, MADS: “Decomposable Graphical Models With a View Towards Outlier Detection and Sparse Tables”, Aalborg University, Department of Mathematical Sciences, 2022, PhD Thesis.

MEYLAND, MARTIN JENSEN: “Blast Loading on Glass in Facedes – Flexural Strength of Monolithic Flat Glass at High Strain Rates”, DTU Construct, 2022, PhD Thesis.

SCHLÜTER, HJØRDIS A.: “Conductivity reconstruction on Riemannian manifolds from power densities”, DTU Compute, 2022, PhD Thesis.

SCHWENK-NEBBE, LEON JOACHIM: “Heterogeneous Carbon Dioxide Emission Constraints in the European Energy System”, Aarhus University, Department of Mechanical and Production Engineering, 2022, PhD Thesis.

STOLTZE, JONAS STEENSGAARD: “Investigation of bracing to unload muscle and knee contact forces for knee osteoarthritis patiens – Modelling, workflow, prototype design and evaluation”, Aalborg University, Department of Materials and Production, 2022, PhD Thesis.

STØTTRUP, BENJAMIN BUUS: “Spectral, scattering, and regularity properties related to various functional and differential equations”, Aalborg University, Department of Mathematical Sciences, 2022, PhD Thesis.

TIEDEMANN, MAREEN: “Verification of Structural Properties for Bend-Twist Coupled Wind Turbine Blades”, DTU Wind, 2022, PhD Thesis.

QUINLAN, ALEX: “Fatigue Behavior of Polymer Composite Materials at the Sub-Structural Scale”, DTU Construct, 2022, PhD Thesis.

SCHWENK-NEBBE, LEON JOACHIM: “Heterogeneous Carbon Dioxide Emission Constraints in the European Energy System”, Aarhus University, Department of Mechanical and Production Engineering, 2022, PhD Thesis.

SKARE, ELISABETH LEITA: “Prediction of rheological properties of filler modified cement paste from constituent properties, flow measurements and modelling”, DTU Construct, 2022, PhD Thesis.

SØRENSEN, KASPER STUDSGAARD: “On some differential equations in mathematical-physisc and singular functions in probability theory”, Aalborg University, Department of Mathematical Sciences, 2022, PhD Thesis.

VIHRS, NINNA: “Aspects of statistical analysis of spatial point patterns”, Aalborg University, Department of Mathematical Sciences, 2022, PhD Thesis.

WANG, GANG: “Flexible Heat Storages Based on Stable Supercooling of Sodium Acetate Trihydrate”, DTU Construct, 2022, PhD Thesis.

ZHANG, BEN:” The automatic optimization of metal forming processes – Inverse identification of constitutive parameters for tubular materials based on hydraulic bulge test”, Aalborg University, Department of Materials and Production, 2022, PhD Thesis.

ZHANG, CHUNLEI: “Boundary dynamics in 3D printed samples”, DTU Construct, 2022, PhD Thesis.

ZHOU, ZHENGXUE: “Interaction dynamics and Control of collaborative industrial mobile robot manipulators for SME manufacturing”, Aarhus University, Department of Mechanical and Production Engineering, 2022, PhD Thesis.

9. DCAMM COURSES GIVEN IN 2022

DTU Construct

High Performance Computing: FORTRAN, OpenMP and MPI
Journal club in fluid mechanics
Journal club in internal combustion engines
Advanced Engineering Thermodynamics
Electron Microscopy and Analysis for Materials Research
PhD course on application of x-ray diffraction in materials science
Nanotribology: Theory and applicatons
Measurement uncertainty estimation using statistical methods

DTU Compute

PhD course on Scientific Machine Learning

DTU Wind Energy

The 7th International Summer School – CINEMAX, August 22 – 26, 2022

Aalborg University's Doctoral School of Engineering and Science

Analysis and Gradient Based Optimization of Laminated Composite Structure

APPENDIX: List of members 2022

Abbreviations:

from Technical University of Denmark

COMPUTE: Dept. of Applied Mathematics and Computer Science
CME-FAM: Dept. of Civil and Mechanical Engineering, Solid Mechanics
CME-FVM: Dept. of Civil and Mechanical Engineering, Fluid Mechanics, Coastal and Maritime Engineering
CME-K&P: Dept. of Civil and Mechanical Engineering, Engineering Design and Product Development
CME-MPP: Dept. of Civil and Mechanical Engineering, Manufacturing Engineering
CME-MTU: Dept. of Civil and Mechanical Engineering, Materials and Surface Engineering
CME-TES: Dept. of Civil and Mechanical Engineering, Thermal Energy
CME-D&P: Dept. of Civil and Mechanical Engineering, Design and Processes
CME-K&S: Dept. of Civil and Mechanical Engineering, Structures and Safety
CME-E&S: Dept. of Civil and Mechanical Engineering, Energy and Services
WIND: Dept. of Wind and Energy Systems

from Aalborg University

BUILD, AAU: Dept. of the Built Environment
MATH, AAU: Dept. of Mathematical Sciences
MECH, AAU: Dept. of Materials and Production

from Aarhus University

CAE, AU: Dept. of Civil and Architectural Engineering
MPE, AU: Dept. of Mechanical and Production Engineering

from University of Southern Denmark

SDU-ME: Dept. of Mechanical and Electrical Engineering

Abbiati, Giuseppe	(CAE, AU)	Assistant Professor
Abkar, Mahdi	(MPE, AU)	Associate Professor
Abrahamsen, Asger	(WIND)	Senior Researcher
Agergaard, Julie Krogh	(CME-K&P)	PhD student
Aghababaei, Ramin	(MPE, AU)	Associate Professor
Aimon, Arhimny Hasdi	(CME-MPP)	PhD student
Alberdi Pagola, Pablo	(CME-K&S)	PhD student
Alexandersen, Joe	(SDU-ME)	Associate Professor
Al-Hagri, Ammar Mohammad A.	(CME-K&S)	Industrial PhD student
Ali, Basit	(CME-MTU)	PhD student
Alibrandi, Umberto	(CAE, AU)	Associate Professor
Aliyar, Sithik	(WIND)	Postdoc
Alting, Leo	(CME-MPP)	Professor Emeritus
Amador, Sandro Diod Rescinho	(CME-K&S)	Assistant Professor
Ambat, Rajan	(CME-MTU)	Professor

Amini-Afshar, Mostafa	(CME-FVM)	Senior Researcher
Anand, Gwendoline Annelise E.	(CME-MPP)	PhD student
Anchondo, Ruben Isaac Erives	(WIND)	Postdoc
Andersen, Asger Gade	(CME-MTU)	PhD student
Andersen, Lars Vabbersgaard	(CAE AU)	Professor, PhD
Andersen, Mads Emil Møller	(CME-K&S)	Industrial PhD student
Andersen, Martin Pihl	(CME-TES)	PhD student
Andersen, Martin Skovgaard	(COMPUTE)	Associate Professor
Andersen, Michael Skipper	(MECH, AAU)	Associate Professor
Andersen, Mikkel	(MATH, AAU)	Associate Professor
Andersen, Poul	(CME-FVM)	Emeritus
Andersen, Sebastian	(CME-K&S)	Postdoc
Andersen, Sebastian Aagaard	(CME-MPP)	Postdoc
Andersen, Søren Juhl	(WIND)	Associate Professor
Andersen, Søren Rindom		Elected member, PhD
Andersson, Mads Lunde	(CME-K&P)	PhD student
Andreasen, Casper Schousboe	(CME-FAM)	Associate Professor
Andreasen, Jens H.	(MECH, AAU)	Associate Professor, PhD
Andreasen, Mogens Myrup	(CME-K&P)	Professor Emeritus
Andresen, Gorm Bruun	(MPE, AU)	Associate Professor
Andrew, Elise Marie	(CME-K&P)	Research Assistant
Andrillo, Tito	(MPE, AU)	Assistant Professor
Ardestani, Alireza Mollaei	(CME-MPP)	PhD student
Arinbjamar, Ulfar	(CME-MPP)	PhD student
Arlitt, Ryan Michael	(CME-K&P)	Assistant Professor
Arora, Vikas	(SDU-ME)	Associate Professor
Aschmoneit, Fynn Jerome	(MATH, AAU)	Assistant Professor
Bahrebar, Saijad	(CME-MTU)	PhD student
Bai, Shaoping	(MECH, AAU)	Professor
Bak, Brian Lau Verndal	(MECH, AAU)	Associate Professor
Balling, Ole	(MPE, AU)	Aff. Professor
Bangaru, Ashish Kumar	(WIND)	Postdoc
Barari, Amin	(BUILD, AAU)	Associate Professor
Bartawi, Emad Hasan	(CME-MTU)	PhD student
Basso, Alberto	(CME-MPP)	Postdoc
Baungaard, Mads Christian	(WIND)	PhD student
Bay, Niels O.	(CME-MPP)	Professor Emeritus
Bayat, Mohamad	(CME-MPP)	Assistant Professor
Beelen, Peter	(COMPUTE)	Professor MSO
Bendsøe, Martin		Elected member, Professor Emeritus, dr. techn.
Berggreen, Christian	(CME-FAM)	Professor
Bingham, Harry B.	(CME-FVM)	Professor
Bisacco, Giuliano	(CME-MPP)	Associate Professor
Bjerregård, Mathias Blicher	(COMPUTE)	PhD student
Björnfot, Kent Anders	(CME-K&S)	Associate Professor
Blinkenberg, Willads Steen Nørholt	(CME-K&P)	PhD student
Bluhm, Gore Lukas	(CME-FAM)	Postdoc
Bohr, Tomas		Elected member, Professor
Brander, David	(COMPUTE)	Associate Professor
Brander, Marco	(CME-MPP)	PhD student
Brandt, Anders	(MPE, AU)	Professor, Head of Department
Branner, Kim	(WIND)	Senior Researcher
Bredmose, Henrik	(WIND)	Professor
Brette, Mathis Mortensen	(MECH, AAU)	Research Assitant
Broberg, Peter Hede	(MECH, AAU)	PhD student
Brok, Niclas Lauersen	(COMPUTE)	PhD student

Bræstrup, M. W.		Elected member, PhD
Bräuner, Lars	(MPE, AU)	Associate Professor
Brøns, Marie	(CME-FAM)	Postdoc
Brøns, Morten	(COMPUTE)	Professor, PhD, Head of Section
Budden, Christian Leslie	(CME-MPP)	PhD student
Budzik, Michal	(MPE, AU)	Associate Professor
Buhl, Thomas		Elected member, Professor
Caballero Arcos, Alejandro Luis	(CME-K&S)	PhD student
Caglio, Luigi	(CME-K&S)	PhD student
Calaon, Matteo	(CME-MPP)	Senior Researcher
Cardenas de Rio, Daniel	(CME-MPP)	PhD student
Carstensen, Stefan	(CME-FVM)	Associate Professor
Castro Ardilla, Oscar Gerardo	(WIND)	Researcher
Cavichiolo, Louis Sadowski	(CME-MPP)	Industrial PhD student
Cederkvist, Jan		Elected member, PhD.
Chang, Bingdong	(CME-MPP)	Postdoc
Chawla, Ashish	(CME-MPP)	Industrial PhD student
Chen, Limin	(CME-FVM)	PhD student
Chen, Tingting	(CME-MPP)	PhD student
Chen, Xiao	(WIND)	Associate Professor
Christensen, Carsten Keinicke Fjord	(CME-K&P)	Postdoc
Christensen, Christian Overgaard	(CME-K&S)	PhD student
Christensen, Christoffer Fyllgraf	(CME-FAM)	PhD student
Christensen, Erik Damgaard	(CME-FVM)	Professor, Head of Section
Christensen, Jens Håkon Visbech	(COMPUTE)	PhD student
Christensen, Jørgen Erik	(CME-E&E)	Associate Professor
Christensen, Ole	(COMPUTE)	Professor, dr.scient.
Christensen, René Bødker	(MATH, AAU)	Assistant Professor
Christensen, Rune Wessel Knaack	(CME-TES)	Research Assistant
Christiansen, Christian Kim		Elected member, PhD.
Christiansen, Jesper De Claville	(MECH, AAU)	Professor
Christiansen, Rasmus Ellebæk	(CME-FAM)	Associate Professor
Christiansen, Thomas Lundin	(CME-MTU)	Associate Professor
Clausen, Johan Christian	(CAE, AU)	Associate Professor
Clausen, Lasse Røngaard	(CME-TES)	Associate Professor
Contaldi, Carmine	(CME-FAM)	PhD student
Cornean, Horia	(MATH, AAU)	Professor
Czapla, Jedrzej Jacek	(CME-K&P)	Research Assistant
Da Costa, Daniel Guzzo	(CME-K&P)	Postdoc
Dahmen, Thomas	(CME-MPP)	Postdoc
Damkilde, Lars	(BUILD, AAU)	Professor
Dammann, Bernd	(COMPUTE)	Associate Professor
Danielak, Anna Halina	(CME-MPP)	Postdoc
Danielsen, Hilmar K.	(WIND)	Senior Researcher
Dawids, Steen	(CME-K&P)	Emeritus
De Chiffre, Leonardo	(CME-MPP)	Professor Emeritus
De Rio, Daniel Cardenas	(CME-MPP)	PhD student
De Sousa Zomer, Thayla Tavares	(CME-K&P)	Postdoc
De Souza, Kleanny Gama Sales	(CME-MTU)	PhD student
Dederichs, Anne Simone	(CME-D&P)	Assosicate Professor
Deininger, Michael	(CME-K&P)	Associate Professor
Desai, Nishith Babubhai	(CME-TES)	Postdoc
Dicholbar, Antariksh	(WIND)	Postdoc
Didriksen, Simon	(CME-K&P)	PhD student
Dimitrov, Nikolai	(WIND)	Senior Researcher
Dominikovic, Dimitri Franjo	(COMPUTE)	Postdoc
Dong, Yiqiu	(COMPUTE)	Associate Professor, PhD

Dragsted, Janne	(CME-E&E)	Senior Researcher
Drozdov, Aleksey	(MECH, AAU)	Professor
Duran, Myka Mae	(CME-MPP)	PhD student
Ebbehøj, Kristian Ladefoged	(CME-FAM)	Industrial PhD student
Echevarria, Diego Martinez	(MECH, AAU)	PhD student
Eder, Martin Alexander	(WIND)	Associate Professor
Eifler, Tobias	(CME-K&P)	Associate Professor
Einafshar, Mohammadjavad	(MECH, AAU)	Postdoc
Elmegaard, Brian	(CME-TES)	Professor, Head of Section
Eltard-Larsen, Bjarke	(CME-FVM)	Postdoc
Endelt, Benny	(MECH, AAU)	Associate Professor
Englmair, Gerald	(CME-E&E)	Postdoc
Engsig-Karup, Allan	(COMPUTE)	Associate Professor
Eriksen, Svante	(MATH, AAU)	Associate Professor
Evgrafov, Anton	(MATH, AAU)	Associate Professor
Faber, Michael Havbro	(BUILD, AAU)	Professor
Fache, Maxime	(CME-MTU)	Research Assistant
Fajstrup, Lisbeth	(MATH, AAU)	Associate Professor
Fan, Jianhua	(CME-E&E)	Associate Professor
Felter, Christian Lotz		Elected member, PhD
Ferrari, Federico	(CME-FAM)	Postdoc
Fischer, Gregor	(CME-K&S)	Associate Professor
Fjerbæk, Esben Visby	(CME-E&E)	Industrial PhD student
Fojan, Peter	(MECH, AAU)	Associate Professor
Fooroughi, Porurya	(MPE, AU)	Assistant Professor
Frankus, Felix Tristan	(CME-MTU)	PhD student
Franza, Andrea	(CAE, AU)	Postdoc
Frederiksen, Andreas	(CME-FAM)	PhD student
Fredsøe, Jørgen	(CME-FVM)	Professor Emeritus
Frier, Christian	(BUILD, AAU)	Associate Professor, PhD
Friis, Naja Kastrup	(CME-D&P)	PhD student
Fuhrman, David R.	(CME-FVM)	Associate Professor
Funch, Cecilie Vase	(CME-MTU)	Postdoc
Furbo, Simon	(CME-E&E)	Associate Professor
Föhring, Leonie	(SDU-ME)	PhD student
Førby, Niels Langballe	(CME-TES)	PhD student
Gao, Meng	(CME-E&E)	PhD student
Gay, Irene Campo	(CME-K&P)	PhD student
Ge, Jingrui	(CME-K&P)	PhD student
Geiselhart, Matthias	(CME-MPP)	Postdoc
Georgakis, Christos T.	(ENG, AU)	Professor
Gigandet, Quetin Yannis Luc	(CME-MTU)	Research Assistant
Gimsing, Niels Jørgen	(CME-K&S)	Professor Emeritus
Giuliani, Luisa	(CME-D&P)	PhD student
Gnilke, Oliver Wilhelm	(MATH, AAU)	Associate Professor
Gohlamar, Alireza	(CME-FAM)	Industrial PhD student
Goltermann, Per	(CME-K&S)	Professor
Gourevitch, Leonid	(MECH, AAU)	Associate Professor
Graeme, Keith		Elected member
Gravesen, Jens	(COMPUTE)	Associate Professor, dr.phil
Greiner, Martin	(MPE, AU)	Professor
Grinderslev, Christian	(WIND)	Postdoc
Gunneskov, Ole		Elected member, PhD.
Gupta, Kapil Kumar	(CME-MTU)	Postdoc
Göral, Koray Deniz	(CME-FVM)	PhD student
Haglind, Fredrik	(CME-TES)	Associate Professor
Hald, John	(CME-MTU)	Professor

Halding, Philip Skov	(CME-D&P)	Assistant Professor
Han, Anpan	(CME-MPP)	Senior Researcher
Hansen, Claus Thorp	(CME-K&P)	Associate Professor
Hansen, Hans Nørgaard	(CME-ADM)	Professor, dr. techn, Head of Department
Hansen, Kasper Barslund	(CME-K&P)	Research Assistant
Hansen, Martin Otto Laver	(WIND)	Associate Professor
Hansen, Per Chr.	(COMPUTE)	Professor, dr. techn.
Harz, Benjamin Arnold Krekeler	(CME-FVM)	PhD student
Hasany, Masoud	(CME-MPP)	Postdoc
Haselbach, Philip Ulrich	(WIND)	Researcher
Hassing, Henrik		Elected member, PhD
Hattel, Jesper Henri	(CME-MPP)	Professor, Head of Section
Henrichsen, Søren Randrup Daugaard		Elected member, PhD
Henriksen, Christian	(COMPUTE)	Associate Professor, PhD
Henriksen, Nikolaj Gersager	(CME-MPP)	Industrial PhD student
Hermansen, Sebastian Malte	(MECH, AAU)	PhD student
Herz, Kristian	(CME-D&P)	Professor Emeritus
Hjorth, Poul	(COMPUTE)	Associate Professor, PhD
Hoang, Cao Linh	(CME-K&S)	Professor
Hodgson, Emily Louise	(WIND)	PhD student
Hodzic, Azur	(CME-FVM)	Postdoc
Hoffmeyer, David		Elected member, PhD
Hussan, Zuffain	(CME-K&S)	PhD student
Husted, Bjarne Bruun Paulsen	(CME-D&P)	Associate Professor
Hvam, Lars	(CME-K&P)	Professor
Hviid, Christian Anker	(CME-E&E)	Associate Professor
Høghøj, Lukas Christian	(CME-FAM)	PhD student
Høgsberg, Jan Becker	(CME-FAM)	Associate Professor
Højsgaard, Søren	(MATH, AAU)	Associate Professor, Head of Department
Ibsen, Lars Bo	(BUILD, AAU)	Professor, PhD
Iori, Jenna	(WIND)	PhD student
Irissappane, Vijayasankar	(SDU-ME)	Industrial PhD student
Isiklar, Göktug	(CME-FAM)	PhD student
Islam, Mohammad Aminul	(CME-MPP)	Associate Professor
Ivanache, Alin-Cosmin	(CME-MPP)	Research Assistant
Ivarsson, Anders	(CME-TES)	Associate Professor
Jacobsen, Christian Brix		Elected member, PhD.
Jakobsen, Christian Sidelmann		Elected member, R&D Engineer
Jakobsen, Lasse	(CME-MPP)	PhD student
Jellesen, Morten Stendahl	(CME-MTU)	Associate Professor
Jensen, Adam Rasmus	(CME-E&E)	Research Assistant
Jensen, Dorte Juul	(CME-MPP)	Professor
Jensen, Henrik Myhre	(MPE, AU)	Professor
Jensen, Janus Walentin	(CME-FAM)	Research Assistant
Jensen, Jonas Kjær	(CME-TES)	Senior Researcher
Jensen, Jørgen Juncher	(CME-FVM)	Professor Emeritus, dr. techn.
Jensen, Kenneth Mahagam	(CME-FAM)	PhD student
Jensen, Lars Rosgaard	(MECH, AAU)	Associate Professor
Jensen, Peter Dørffler Ladegaard	(CME-FAM)	PhD student
Jensen, Simon Mosbjerg	(MECH, AAU)	Research Assistant
Jespersen, Kristine Munk	(WIND)	Postdoc
Jespersen, Mads Carsten	(CME-TES)	Scientific Assistant
Jin, Peng	(CME-MPP)	PhD student
Jokisch, Beñat Marinez de Aguirre	(CME-FAM)	PhD student
Juhl, Peter Møller	(SDU-ME)	Associate Professor
Juhl-Nyholm, Herle Kjemtrup	(CME-K&P)	PhD student
Jung, Yun Sub	(MECH, AAU)	PhD student

Junker, Rune Grønborg	(COMPUTE)	Assistant Professor
Jönsson, Jeppe	(CME-K&S)	Professor
Jørgensen, Jakob Sauer	(COMPUTE)	Senior Researcher
Jørgensen, Jens Grandjean		Elected member, PhD
Jørgensen, Jesper Kjær	(WIND)	PhD student
Jørgensen, John Bagterp	(COMPUTE)	Associate Professor
Kabel, Thomas	(CAE, AU)	Postdoc
Kain, Martin	(CME-MPP)	PhD student
Kanbur, Baris Burak	(CME-TES)	Postdoc
Karamehmedovic, Mirza	(COMPUTE)	Associate Professor
Karlshøj, Jan	(CME-D&P)	Associate Professor, Head of Section
Kaschube, Deborah	(SDU-ME)	PhD student
Katsanos, Evangelos	(CME-K&S)	Associate Professor
Kepler, Jørgen	(MECH, AAU)	Associate Professor
Kermani, Nasrin Arjomand	(CME-TES)	Postdoc
Khan, Daniyal	(SDU-ME)	PhD student
Khosravi, Ali	(SDU-ME)	Associate Professor
Kim, Taesong	(WIND)	Associate Professor
Kirkegaard, Poul Henning	(CAE, AU)	Professor
Kivilcim, Aysegül	(MATH, AAU)	Assistant Professor
Kjer, Magnus Bolt	(CME-MPP)	PhD student
Klit, Peder	(CME-FAM)	Professor Emeritus, PhD
Knipschildt, Elisabeth Filippa F.	(CME-MPP)	PhD student
Knoll, Maximilian	(CME-MPP)	Research Assistant
Knudsen, Kim	(COMPUTE)	Associate professor
Knudsen, Stig Staghøj	(CME-FVM)	PhD student
Kodsy, Costy	(MATH, AAU)	Assistant Professor
Kofler, René	(CME-TES)	PhD student
Kolarik, Jakub	(CME-E&E)	Associate Professor
Kong, Weiqiang	(CME-E&E)	Senior Researcher
Koohestanian, Mohammad	(CME-MPP)	Postdoc
Koss, Holger	(CIVIL)	Associate Professor
Kothari, Rohit	(CME-TES)	Postdoc
Kotol, Martin	(CME-E&E)	Associate Professor
Kovács, Gergely	(CME-FVM)	PhD student
Krenk, Steen	(CME-FAM)	Professor Emeritus, dr.techn.
Kristensen, Philip Kræn	(CME-FAM)	Postdoc
Kristiansen, Kristian Uldall	(COMPUTE)	Associate Professor
Kristoffersen, Julie Carøe	(CAE, AU)	Postdoc
Krogh, Christian	(MECH, AAU)	Postdoc
Kumar, Amit	(CME-TES)	Postdoc
Kumar, Rajnish	(WIND)	PhD student
Kücükavci, Ali	(CME-E&E)	PhD student
Körkel, Andreas F.K.	(CME-MTU)	Research Assistant
Lading, Tove	(CME-D&P)	Associate Professor
Lakkaraju, Anish Rao	(CME-MTU)	PhD student
Langthjem, Mikael	(MPE, AU)	Associate Professor
Larsen, Gunner	(WIND)	Senior Researcher
Larsen, Jan Balle		Elected member, PhD.
Larsen, Jeff	(CME-K&S)	PhD student
Larsen, Michael Roland	(CME-MPP)	Industrial PhD student
Larsen, Poul Scheel	(CME-FVM)	Professor Emeritus, PhD
Larsen, Raino Mikael	(MECH, AAU)	Associate Professor
Legarth, Brian N.	(CME-FAM)	Associate Professor, dr. techn.
Lemvig, Jakob	(COMPUTE)	Associate Professor
Lenau, Torben Anker	(CME-K&P)	Associate Professor
Leto, Harun	(MECH, AAU)	Research Assistant

Li, Feng	(CME-MTU)	Postdoc
Li, Jiayi	(CAE, AU)	PhD student
Li, Rongling	(CME-E&E)	Associate Professor
Li, Runguang	(CME-MPP)	Postdoc
Liang, Jierong	(CME-TES)	Postdoc
Liano, Javier Cabello	(CME-K&P)	PhD student
Lin, Lujin	(CME-FAM)	PhD student
Lindgaard, Esben	(MECH, AAU)	Associate Professor
Lindkvist, Adam Alexander	(CME-MPP)	PhD student
Lindvald, Martin Vorup	(MECH, AAU)	PhD student
Lio, Alan Wai Hou	(WIND)	Researcher
Liu, Qiong	(CAE, AU)	PhD student
Liu, Wenqian	(CME-D&P)	PhD student
Lori, Ali Rezaei	(CME-MPP)	PhD student
Lund, Erik	(MECH, AAU)	Professor, PhD
Lund, Ivar	(SDU-ME)	Associate Professor
Luongo, Andrea	(CME-MPP)	Postdoc
Lyck, Christian	(CME-MPP)	Industrial PhD student
Lydakis Simantiris, Emmanouil	(CME-K&S)	PhD student
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