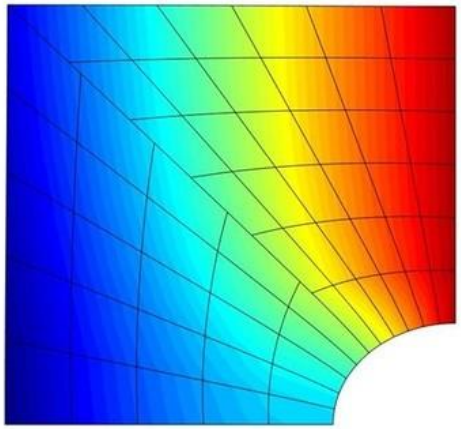

XIII Finnish Mechanics Days 2018

August 29–31
Aalto University
Helsinki, Finland

Diamond Partner *Wärtsilä*

Golden Partner *EDRMedeso*

Host Partner *City of Helsinki*

Silver Partners *Comsol*, *Foreship*, *HBM Finland*, *Infradex*, *Sweco Rakennetekniikka*, *Teknologiateollisuus*

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Aalto University
School of Engineering

Program Frame for the XIII Finnish Mechanics Days 2018

Wednesday, August 29	
17.30–17.45	Arrival to Reception at Helsinki Town Hall, Aleksanterinkatu 20
18.00–19.00	City of Helsinki Reception, Empiresali
19.15	Get-together night at Brewery-Restaurant Bryggeri Helsinki, Sofiankatu 2

Thursday, August 30				
8.00–9.00	Registration at Chydenia, Runeberginkatu 22–24, 1st floor lobby			
9.00–9.15	Opening, Vice Dean Pentti Kujala, Room H324 (Saastamoisen Säätiö, 3rd floor)			
9.15–10.00	**Plenary Lecture 1**, Room H324 (Saastamoisen Säätiö, 3rd floor) Prof. Emer. Laszlo Fuchs, KTH, Sweden *Fluid mechanics of blood flow in life saving devices: accomplishments and challenges* **Word for Diamond Partner**			
10.00–10.30	Coffee Break (Registration), ground floor lobby			
10.30–12.30	**Session 1A**, H324 Computation 1	**Session 1B**, G111 Fluids 1	**Session 1C**, G112 Materials 1	**Session 1D**, G109 Structures 1
12.30–13.30	Lunch at Fazer Chydenia (Registration), ground floor restaurant			
13.30–14.15	**Plenary Lecture 2**, Room H324 (Saastamoisen Säätiö, 3rd floor) Prof. Emer. Viggo Tvergaard, DTU, Denmark *Modelling ductile fracture at moderate to low stress triaxiality* **Word for Golden Partner**			
14.15–14.45	Coffee Break (Registration), ground floor lobby			
14.45–16.45	**Session 2A**, H324 Computation 2	**Session 2B**, G111 Fluids 2	**Session 2C**, G112 Materials 2	**Session 2D**, G109 Models
17.00–18.00	Brainstorming Sessions on Collaboration Across the Borders, Room H324			
20.00–23.00	Banquet at Restaurant Meripaviljonki, Säästöpankinranta 3, Helsinki			

Friday, August 31				
9.15–11.15	**Session 3A**, H324 Computation 3	**Session 3B**, G111 Ice, Rock ‘n’ Soil	**Session 3C**, G112 Materials 3	**Session 3D**, G109 Structures 2
11.15–11.45	Coffee Break (Registration), ground floor lobby			
11.45–12.30	**Plenary Lecture 3**, Room H324 (Saastamoisen Säätiö, 3rd floor) CEO, DSc (Tech) Patrik Rautaheimo: *Use of numerical simulations in engineering and design* **Word for Diamond Partner**			
12.30–13.30	Lunch at Amica Chydenia, ground floor restaurant			
13.30–15.30	**Session 4A**, H324 Computation 4	**Session 4B**, G111 Machines	**Session 4C**, H324 Materials 4	**Session 4D**, G109 Structures 3
15.30–15.45	Closing, Conference Chairs			
15.45–16.15	Farewell Coffee, ground floor lobby			

Note: Speakers are asked to meet the Session Chair/Assistant in the session room about 15 minutes before the start of session for the technicalities related to files, computers, pointers etc.

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Thursday, August 30

Session 1A / Computation 1 / Chair Stenberg / Assistant Tsiptsis / Room H-324 (3rd floor, Saastamoisen Säätiö)
10.30 **Abed**, Solowski — Simulation of thermo-hydro-mechanically coupled processes with Aalto THMC finite element code
10.50 Pajunen, **Hautala**, Heinisuo — A method for finite element analysis of stressed skin structures utilizing simplified geometry
11.10 **Vilppo**, Malinen, Hartikainen, Kolari, Kouhia — Numerical implementation of an anisotropic continuum damage model
11.30 **Malinen** — A geometrically nonlinear shell model implemented into Elmer and its verification
11.50 **Aho**, Frondelius – A practical JuliaFEM usage demo
12.10 Byckling, **Kataja,** Zwinger — Optimization of finite element assembly: case study on glaciology

Session 1B / Fluids 1 / Chair Auvinen / Room G-111 (1st floor)
10.30 **Vuorinen**, Peltonen, Saari — Heat transfer characteristics of plate and pin-fin heat exchangers subjected to pipe low turbulence
10.50 Niemelä, Pajunen, **Välikangas** — Conjugate heat transfer simulation of a hollow beam in a standard fire
11.10 **Lindstedt**, Lehtinen, Haaslahti — Conjugate heat transfer in a pin fin heat sink
11.30 **Filimonov** — Numerical simulation of fluid flow in an industrial dissolved air flotation unit
11.50 **Saifi**, Cronvall — Development of a robust thermal load function from CFD results
12.10 **Karvinen** — Paneeli- ja kontrollitilavuusmenetelmien vertailu pienen H-roottorisen tuulivoimalan numeerisessa simuloinnissa

Session 1C / Materials 1 / Chair Niemi / Assistant Castillo / Room G-112 (1st floor)
10.30 **Laukkanen**, Suhonen, Majaniemi, Lindroos, Andersson, Pinomaa — Micromechanics and multiscale materials modeling in design of new high-entropy materials and microstructures
10.50 **Ahmed**, Rasilo — Uncertainty and reliability analysis of experimental results for magnetostrictive material characterization and validation of numerical model
11.10 Nguyen, **Castillo**, Niiranen — Heterogeneous vs. homogeneous approach when modelling damage in quasi-brittle materials
11.30 **Adibaskoro**, Sołowski, Hostikka — MPM simulations of wood with advanced multi-surface material model
11.50 Björk, **Afkhami** — Reliability of cold-formed ultra-high strength steel S1100 after welding
12.10 **Freund**, Karakoç — Statistical homogenization of elastic band material

Session 1D / Structures 1 / Chair Polojärvi / Assistant Balobanov / G-109 (1st floor, KPMG-sali)
10.30 **Katajisto**, Kere, Lyly — A Model for fast delamination analysis of laminated composite structures
10.50 **Hannula**, Pajunen, Mela, Heinisuo — Sandwich panels to restraint flexural buckling
11.10 **Balobanov**, Khakalo, Kiendl, Niiranen — Gradient-elastic shell structures: mathematical models, isogeometric analysis and applications
11.30 **Khakalo**, Tuteja, Niiranen — Strain gradient anisotropic thermoelastic plate models: Variational formulations and isogeometric analysis
11.50 **Markou**, St-Pierre — Improving the properties of lattice materials by optimising the cell wall thickness
12.10 **Baroudi**, Kiviluoma, Kouhia, Paavola, Salokangas — Simple method for dynamic analysis of flexible cables

Thursday, August 30

Session 2A / Computation 2 / Chair Malinen / Assistant Tsiptsis / Room H-324 (3rd floor, Saastamoisen Säätiö)
14.45 Gustafsson, **Stenberg**, Videman — Nitsche's method for contact problems
15.05 Kouhia, **Niemi** — Numerical analysis of Cosserat-elastic beam models
15.25 **Tsiptsis**, Balobanov, Niiranen — 3D isogeometric curved advanced beam element as ABAQUS user element
15.45 Freund, **Salonen** — A modified four-node rectangular element
16.05 **Nguyen**, Niiranen — Continuum damage modelling within classical and strain gradient elasticity
16.25 **Fedoroff**, Calonius — Using Abaqus CDP model in impact simulations

Session 2B / Fluids 2 / Chair Vuorinen / Room G-111 (1st floor)
14.45 **Auvinen**, Järvi, Boi, Hellsten, Vesala — Numerical sensitivity study of urban boundary layer flows with large-eddy simulation
15.05 **Laurila**, Vuorinen — Numerical study of a pressure-swirl atomizer using LES/VOF
15.25 **Peltonen**, Vuorinen, Karttunen — Fluid dynamical aspects of Atomic Layer Deposition process
15.45 **Turunen-Saaresti**, Afzalifar, Ameli — Effects of higher order advections schemes in method of moments and quadric method of moments in non-equilibrium flows
16.05 **Ameli**, Turunen-Saaresti — Modeling of supercritical thermophysical properties for the near-critical point applications
16.25

Session 2C / Materials 2 / Chair Freund / Room G-112 (1st floor)
14.45 **Kanerva**, Jokinen — The influence of load introduction to a nacre submodel concept
15.05 **Mohanty**, Michler — In-situ SEM extreme nanomechanical testing: high temperatures and ultra-high strain rates
15.25 **Manninen**, Ylimäinen, Råback — Modelling of the temperature distribution and microstructural changes in batch annealing of martensitic stainless steel coils
15.45 **Kõrgesaar** — Strain paths in large scale structural simulations
16.05 **El Gharamti**, Dempseya, Tuhkuri, Polojärvi — Cohesive crack model applied to different crack confgurations
16.25 **Roiko** — Fatigue crack growth threshold for small cracks

Session 2D / Models / Chair Kouhia / Assistant Khakalo / G-109 (1st floor, KPMG-sali)
14.45 **Santaoja** — On damage mechanics
15.05 **Jeronen**, Rasilo, Kataja — A new material model for magnetostrictive materials in the open-source Elmer FEM software
15.25 Holopainen, **Piirilä**, Salmela — Patentability of mathematical modelling and simulation methods
15.45 **Frondelius**, Mäntylä, Vaara — Teknillisen mekaniikan tutkimuksen eettisistä kysymyksistä ja haasteista
16.06 **Ranta** — Tuulimyllyn matemaattinen malli
16.25 Ranta, **Hosia** — Kirkkoveneen soutamisen malli

Friday, August 31

Session 3A / Computation 3 / Chair St-Pierre / Assistant Nguyen / Room H-324 (3rd floor, Saastamoisen Säätiö)

9.15 **Yu**, Matikainen, Mikkola — Contact descriptions in multibody applications based on the cone complementary approach
9.35 **Abe**, Narra, Nikander, Hyttinen, Kouhia, Sievänen — Exercise loading history and fall-induced hip fracture risk: A finite element modeling study
9.55 **Liu**, Paavola — A gradient based global optimization method with varying subspaces
10.15 **Yanchukovich**, Björk, Ahola — Moniaksiaalisen kuormitushistorian ääriarvopistedatan sykliluokitus
10.35 **Gong**, Polojärvi, Tuhkuri — Ridge resistance of ships: A DEM study
10.55 **Mäntylä**, Juoksukangas, Hintikka, Frondelius — FEM-based wear simulation for fretting contacts

Session 3B / Ice, Rock 'n' Soil / Chair Tuhkuri / Assistant Castillo / Room G-111 (1st floor)

9.15 **Mardoukhi**, Saksala, Hokka, Kuokkala — An experimental and numerical study of the dynamic Brazilian disc test on a heterogeneous rock
9.35 **Tran**, Solowski — Applications of generalized interpolation Material Point Method in modelling of clays
9.55 **Zwinger**, Hartikainen, Cohen, Råback — A high-resolution coupled permafrost model
10.15 **Lemström**, Polojärvi, Tuhkuri — Numerical modelling of ice-structure interaction in shallow water
10.35 **Lilja**, Polojärvi, Tuhkuri — An edge-loaded, free, thin, square-shaped, elastic ice sheet – a three-dimensional combined Finite-Discrete Element (FE-DE) approach
10.55 **Herrmann** — About the infuence of fiber orientations on the fracture of fiber concrete

Session 3C / Materials 3 / Chair Kanerva / Room G-112 (1st floor)

9.15 **Juoksukangas**, Hintikka, Lehtovaara, Mäntylä, Vaara, Frondelius — Avoiding the high friction peak in fretting contact
9.35 Barriere, Cheng, **Holopainen** — Modeling of mechanical behavior of amorphous solids under cyclic loading conditions
9.55 Holopainen, Frondelius, **Kouhia**, Ottosen, Ristinmaa, Vaara — An evolution-equation-based unified low- and high-cycle fatigue model
10.15 **Saksala**, Pressacco, Holopainen, Kouhia — Numerical modelling of heat generation during shear band formation in brittle materials
10.35 Frondelius, **Kaarakka**, Kouhia, Mäkinen, Orelma, Vaara — Evolution-equation-based high-cycle fatigue model with stress history modelled as a stochastic process
10.55 Pihlajamäki, **Bossuyt** — Characterisation of dynamic strain ageing using full-field measurements

Session 3D / Structures 2 / Chair Khakalo / G-109 (1st floor, KPMG-sali)

9.15 **Hettula** — Moment-rotation response of a flush end-plate splice
9.35 **Markou**, Oliveto — Pushing and quick-release device for free-vibration tests
9.55 **Rehman**, Fedoroff, Raiskila, Niiranen — Finite element analysis of impact-perforated reinforced concrete slabs
10.15 **Tiainen** — Nurjahduspituus kehämäisten kantavien rakenteiden optimoinnissa
10.35 **Amraei** — CFRP (carbon fibre reinforced polymer) strengthening of high and ultra-high strength steels (HSS/UHSS)
10.55 **Viitanen** — DDES and URANS simulations of two-phase marine propeller flows for the assessment of propeller induced underwater noise

Friday, August 31

Session 4A / Computation 4 / Chair Balobanov / Room H-324 (3rd floor, Saastamoisen Säätiö)
13.30 **Ekman**, Aho, Kuivaniemi, Liljenfeldt, Frondelius — JuliaFEM dynamics by DifferentialEquations.jl
13.50 **Jämsä**, Aho, Kuivaniemi, Liljenfeldt, Frondelius — JuliaFEM 2D and 3D beam element implementation
14.10 **Rapo**, Vaara, Aho, Kuivaniemi, Liljenfeldt, Frondelius — Pipe routing optimization to avoid vibration problems by using JuliaFEM
14.30
14.50
15.10

Session 4B / Machines / Chair Frondelius / Room G-111 (1st floor)
13.30 **Siivonen**, Paloniitty, Linjama, Hynnä, Launis — Suitability of laminated steel-copper structure for high-pressure hydraulic manifolds
13.50 **Partanen** — Simulation of the resonant loads with azimuth thruster using measurement data
14.10 **Hintikka**, Lehtovaara, Lalit, Mäntylä, Frondelius — Sphere-on-plane fretting experiments with sinusoidal quenched and tempered steel contact
14.30 **Karvinen**: Efficient methods to optimize heat exchangers
14.50 **Saarela** — Coupled flexible multibody dynamics and hydraulic simulation for a load device
15.10 **Tauriainen**, Kuivaniemi, Heilala, Oksanen, Frondelius — Engine Dynamics: Matching Calculations and Measurements

Session 4C / Materials 4 / Chair Balobanov / Room H-324 (3rd floor, Saastamoisen Säätiö)
13.30
13.50
13.10
14.30 **Lindroos**, Laukkanen, Andersson — On the modeling of crystal plasticity-based damage in martensitic steel microstructures and aspects of industrially driven virtual design of material solutions
14.50 Hintikka, Lehtovaara, **Pun**, Mäntylä, Frondelius — Sphere-on-plane fretting experiments with GJS-GJS contact
15.10 **Vaara**, Kunnari, Frondelius — Literature review of fatigue assessment methods in residual stressed state

Session 4D / Structures 3 / Chair Heinisuo / Assistant Nguyen / G-109 (1st floor, KPMG-sali)
13.30 **Jarmai**, Petrik — Optimum design of welded asymmetric I-beams for minimum welding shrinkage
13.50 **Bączkiewicz**, Burgess, Pajunen, Malaska, Heinisuo — Evaluation of the behavior of square hollow section joints under ambient and fire conditions
14.10 **Jaaranen**, Fink — Numerical modelling and experimental testing of a dovetail splice joint for wood-based panels
14.30 **Ramakrishnan**, Orell, Sarlin, Kanerva, Hokka — Adhesion properties of novel steel–biocomposite hybrid structure
14.50 **Cronvall** — Long-term operation of BWR RPV and its internals
15.10 **Varpasuo** — Updating of seismic hazard and seismic ground motion for Finnish nuclear sites during the years 2009–2018