

# Ali ESMAEILI

Researcher in Solid and Structural Mechanics

Expert in Solid and Structural Mechanics with the focus on FE analysis, material modelling and fatigue analysis of engineering materials. Very interested in teaching, training and mentorship. Dedicated, organised, communicative, problem solver and enjoy working both individually and in team.



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## WORK EXPERIENCE

Research assistant, Chalmers University of Technology, Göteborg, Sweden  
NOV 2019 - FEB 2020

- Programming and development of an existing computational code for elasto-plastic self-consistent simulation of polycrystalline aggregates.
- Supervision of the structural analysis team in Chalmers Formula Sailing project ([website](#)).

Researcher Ph.D. student, Chalmers University of Technology, Göteborg, Sweden  
DEC 2013 - JAN 2019

- Writing a doctoral thesis with the focus on railway application within CHARMEC center of excellence ([website](#)).
- Planning, executing and developing different phases of my PhD project.
- Developing material and FE simulation models for structural analysis of railways rail and wheel steels subjected to high mechanical loads and elevated temperatures (e.g. during braking scenario).
- Investigation on the influence of phase transformations on the rail/wheel steel's mechanical behavior.
- Employing the FE simulation results to perform fatigue analysis on the material.
- Writing several scientific journal papers and presenting in various international conferences (see [Publications Page](#)).
- Peer review an article for international journal of Wear.
- Supervising and tutoring several courses at bachelor and master levels.

Project manager & CAE expert, Behfan Palayesh Amirkabir Co., Isfahan, Iran  
JAN 2013 - OCT 2013

- Project management for designing and manufacturing of spare parts for petrochemical industry.
- Designing and recommending equipment based on analysis and customer expectations.

Project assistant, Chalmers University of Technology, Göteborg, Sweden  
JUL 2012 - DEC 2012

- Research on construction of macroscale yield surfaces for ductile composites employing computational homogenization techniques.
- Proposing a new strategy for predicting macroscopic yield surfaces in virtual material testing.

## EDUCATION

**Doctor of Philosophy - Ph.D.** in SOLID AND STRUCTURAL MECHANICS, CHALMERS UNIVERSITY OF TECHNOLOGY  
DEC 2013 - JAN 2019 GÖTEBORG, SWEDEN

Thesis on modelling of cyclic and viscous behaviour of thermomechanically loaded pearlitic steels with application to tread braked railway wheels.

**M.Sc.** in APPLIED MECHANICS - DESIGN OF SOLIDS, CHALMERS UNIVERSITY OF TECHNOLOGY

AUG 2010 - JUN 2012 GÖTEBORG, SWEDEN

Thesis on multiscale modelling of micro-heterogeneous composites for constructing macroscale yield surfaces of ductile composites.

**B.Sc.** in MECHANICAL ENGINEERING - DESIGN OF SOLIDS, AZAD UNIVERSITY

AUG 2004 - SEP 2009 ISFAHAN, IRAN

## SKILLS

TECHNICAL	Multiscale finite element modelling. Linear and non-linear finite element simulations. Developing and calibration of constitutive models . Structural and fatigue analysis of steel components. Strong skills in programming and developing algorithms. Linear and non-linear optimization. Structural/topology optimization. Design engineering of mechanical structures. 3D CAD systems and technical drawings.
SOFTWARE	<b>ABAQUS:</b> 5 years of simulation experience and coding by (FORTRAN) user-subroutines. <b>MATLAB:</b> 8 years of coding experience. <b>FORTRAN:</b> 5 years of coding experience. <b>PYTHON:</b> experienced. <b>ANSYS:</b> experienced. <b>COMSOL:</b> moderate experience. <b>Chalmers PC-clusters (Hebbe, Glenn)</b> <b>Version control:</b> Git <b>WORD, POWERPOINT, EXCEL and L<sup>A</sup>T<sub>E</sub>X</b>
GENERAL	Strengths in ability to identify problems and finding the solutions. Strong communications skills at research level. Experienced to work both in teams and individually. Strong writing and presenting skills. Project management. Organising meetings and events. Research, teaching and training, managing data and information.

## SELECTED TEACHING EXPERIENCES

- **Finite element analysis (Abaqus):**  
Lecture, 2019.
- **Mechanics of Solids and Fluids:**  
Problem solving/Computer lab assistant, 2015 - 2018.
- **Finite element method - Structures:**  
Computer lab assistant, 2014 - 2018.
- **Statics and Strength of materials:**  
Problem solving/Computer lab assistant, 2016 - 2017.
- **Programming in Matlab:**  
Computer lab assistant, 2015.

## SELECTED PUBLICATION

- A. Esmaeili, M. Singh Walia, K. Handa, K. Ikeuchi, M. Ekh, T. Verneresson, J. Ahlström, *A methodology to predict thermomechanical cracking of railway wheel treads: From experiments to numerical predictions*, International Journal of Fatigue, 105 (2017), pp: 71-85. <https://doi.org/10.1016/j.ijfatigue.2017.08.003>
- M. Singh Walia, A. Esmaeili, T. Verneresson, R. Lundén, *Thermomechanical capacity of wheel treads at stop braking: A parametric study*, International Journal of Fatigue, 113 (2018), pp: 407-415. <https://doi.org/10.1016/j.ijfatigue.2018.04.031>  
**Applicant's contributions:** Developing the material model, contribution in development of FE model and performing the computations. All authors discussed the results and contributed to the final manuscript.
- A. Esmaeili, S. Asadi, F. Larsson, K. Runesson, *Construction of macroscale yield surfaces for ductile composites based on a virtual testing strategy*, European Journal of Mechanics-A/Solids, 77 (2019), 103786. <https://doi.org/10.1016/j.euromechsol.2019.04.019>
- A. Esmaeili, J. Ahlström, M. Ekh, *Modelling of cyclic plasticity and phase transformations during repeated local heating events in rail and wheel steels*, Submitted for publication in an International Journal.
- A. Esmaeili, J. Ahlström, M. Ekh, D. Nikas and T. Verneresson, *Modelling of temperature and strain rate dependent behaviour of pearlitic steel in block braked railway wheels*, To be submitted for international publication.
- A. Esmaeili, T. Verneresson, D. Nikas and M. Ekh, *High temperature tread braking simulations employing advanced modelling of wheel materials*, Proceedings of the 11th International Heavy Haul Association Conference (IHHA 2015) Perth. (2015), Pages 44-51

## SELECTED TALKS (3 OF 12)

- International Conference On Computational Plasticity. Fundamentals and Applications, Sep. 2017, Barcelona, Spain. "Modelling of cyclic and viscous behaviour of pearlitic steels-application to tread braked railway wheels"
- International Conference on Contact Mechanics, Sep 2015, Colorado Springs, USA. "Thermomechanical cracking of railway wheel treads: a combined experimental and numerical approach"
- The 11th International Heavy Haul Association Conference, June 2015, Perth, Western Australia. "High temperature tread braking simulations employing advanced modelling of wheel materials"

## SELECTED COURSES

Finite element methods-Applications  
Computational nonlinear mechanics  
Advanced material mechanics  
Mechanical performance of engineering materials  
Advanced fatigue and fracture analysis  
Computational contact mechanics  
Structural and Topology optimization  
Python and High Performance Computing  
Structural dynamics  
Rigid body dynamics  
Lubrication & Tribology

## INTERESTS AND ACTIVITIES

Playing Piano, Guitar and Setar  
Travelling  
Sports (Hiking, Cycling, Skiing, Football)  
Reading (historical books, detective novels, science and technology)

References are available upon request. May 18, 2020