Irfan Habeeb C N

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Personal website
LinkedIn

Profile

Expert in engineering design, 5+ years of experience in computational mechanics, 3D modeling and programming. Professional with project experiences from concept to development.

Skills

- 3D modeling and FEA.
- Thermomechanical analysis.
- CAD & CAE – SolidWorks, CATIA, AutoCAD, Creo and Pro-E.
- Programming – Matlab, Python, Fortran, and Javascript.
- Software – Abaqus, Siemens NX, Ansys and Autodesk Inventor.

Education

- PhD in Mechanical Engineering, Technion IIT, Israel. (*2016 - 2021*)
- Masters in Aerospace Engineering, IIT Madras, India. (*2014 - 2015*)
- Bachelors in Aerospace Engineering, IIT Madras, India. (*2010 - 2014*)

Experiences

PhD: (*Technion - Israel Institute of Technology, Oct 2016 – Feb 2021*)

✓ The PhD is funded by **Marie Skłodowska-Curie ITN-ETN** scholarship from European Union (Horizon 2020) involving a collaboration of 3 universities and 5 industries including Airbus Defense & Space and Rafael Advanced Defense Systems Ltd.

✓ Objective of the PhD was to use the concept *'Design to Demise'* to fail a system in a controlled manner using experiments and simulations.

✓ Development and validation an accurate model to predict the damage of ceramics.

✓ Use of 3D modeling, structural and thermomechanical analysis.

Internship: (***Airbus*** *Defense & Space, Madrid, July - Sept 2019*)

✓ Worked on a numerical model of a component in the stage separation unit of the satellite launcher using Abaqus and SolidWorks.

✓ Created a model to analyse the thermomechanical properties under extreme loadings.

✓ Implemented the model using finite elements in Abaqus with a custom subroutine.

Research collaborations:

1. LEM3 - University of Lorraine, France (*Sept – Nov 2018*)

✓ Development and implemention a damage model using FEA for ceramics.

✓ Demonstration of the capability of the model to predict the fracture pattern even for a complex geometry.

2. UC3M - University of Carlos III Madrid (*June - July 2019*)

✓ Development of multiple material models using FEA and implemented in Abaqus software.

✓ Studied different finite element programs to implement multiple material models.

Research assistant: (*NIOT India, Apr - Sept 2016*)

✓ Developed the control system for the motion of a robotic fish for underwater exploration.

✓ Implemented PID control system design in Matlab Simulink.

Software developer: (*Moonraft Innovation Labs, India, Sep 2015 - Apr 2016*)

✓ Front end development of websites and android based applications.

✓ Worked on GUI for applications and modules using HTML/CSS and JavaScript.

Projects

3D modeling and testing of metals and ceramics (CAD & FEA):

- ✓ Numerical analysis and testing to analyse the fracture in metals and ceramics, in order to control the material damage.
- ✓ Developed tools to detect the crack path and fracture properties using image correlation.

Fracture of 3D printed polymers:

- ✓ Experimentally studied the properties of 3D printed materials and sandwich structures.
- ✓ Generated a database on the role of loading rate in the nature of fracture.

Sheet metal forming – Thermomechanical analysis:

- ✓ Development of a numerical model to predict the failure of sheet metals under different environmental conditions to evaluate the limit of deformation (FLD).
- ✓ Quantified the influence of strain rate, temperature, and friction on the fracture.

Structural analysis of lattice structures (metamaterials):

- ✓ Investigation of the material properties of the gyroid geometry (curved lattice structure) and the development of yield curve using FEA.

Fracture of Silicon Carbide:

- ✓ Evaluated the fracture characteristics of SiC with experiments and highspeed photography.

Organization & Teaching

- Organized workshops and competitions to teach *building RC aircrafts* nearly 1000 students in India.
- Mentored several bachelor and master students during Masters and PhD.

Developed tools

The tools are public at https://github.com/irfancn.

- **Material model (FEA)**: Subroutines in Abaqus (VUMAT&UMAT) with strain rate, temperature and shear stress dependencies using damage models.
- **Damage model (FEA)**: User element subroutine for Abaqus (UEL) to implement the Phase Field Model.
- **Matlab codes**: Assessment of fracture characteristics such as crack path and fracture energy release rate from testing using Digital Image Correlation.
- **Abaqus subroutines**: Cohesive Zone, Viscoelastic material and Johnson-Cook material models developed using FEM for thermomechanical analysis.

International events

- Presented research at 5 international conferences. Attended 3 workshops and 1 summer school leading to a deep understanding and exposure in research and development.
- Secondments in Spain and France, and an internship in Spain (Airbus Defense & Space).

Achievements

- **Marie Skłodowska-Curie ITN-ETN** scholarship from Project ITN OUTCOME organized by European Union's Horizon 2020 research and innovation program.
- All India Rank 89 in Graduate Aptitude Test in Engineering-2014 (top 0.5%).

Personal vitae

Sex	Male
Nationality	Indian
Language	English (C2)