Irfan Habeeb C N

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LinkedIn

Profile

Expert in engineering design, 5+ years of experience in structural mechanics, data analysis and programming. Professional with project experience from concept to development.

Skills

- 3D modeling and FEM.
- CAD & CAE – SolidWorks, CATIA, AutoCAD and Pro-E.
- Programming – Matlab, Python, Fortran, and Javascript.
- Software – Abaqus, Ansys, Autodesk Inventor, and MS Office.
- Image processing.

Education

- PhD in Mechanical Engineering, Technion IIT, Israel. (*2016 – expected Oct 2020*)
- Masters in Aerospace Engineering, IIT Madras, India. (*2014 - 2015*)
- Bachelors in Aerospace Engineering, IIT Madras, India. (*2010 - 2014*)

Experience

Doctoral fellow: (*Technion - Israel Institute of Technology, Oct 2016 - Present*)

✓ 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.

✓ Studied the concept *'Design to Demise'* to fail a system in a controlled manner using experimental and numerical methods.

✓ Developed and validated an accurate model to predict the damage of materials.

✓ Utilized 3D modeling, structural analysis, and image processing.

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

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

✓ Delivered a reliable model to examine the fracture under extreme loading conditions.

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

Research collaborations:

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

✓ Developed and implemented a damage model using FEA for brittle materials.

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

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

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

✓ Learned the finite element programs to implement multiple material models.

Research assistant: (*IIT Madras & 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, Bangalore, Sep 2015- Apr 2016*)

✓ Front end development of websites and android based applications.

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

Projects

3D modeling and material testing (CAD & FEA):

- ✓ Conducted numerical analysis and testing to analyse the fracture in brittle materials, in order to control the material failure.
- ✓ 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.

Failure of sheet metals (FEA):

- ✓ Developed 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 metamaterials:

- ✓ Studied material properties of the Gyroid geometry and developed the yield surface using FEA. The Gyroid is used to strengthen the sandwich structures similar to the honeycomb.

Fracture of Silicon Carbide:

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

Developed tools

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

- **Material model (FEA)**: Implemented subroutines in Abaqus (VUMAT&UMAT) with strain rate, temperature and shear stress dependencies using damage models.
- **Damage model (FEA)**: Developed user element subroutine for Abaqus (UEL) to implement the Phase Field Model.
- **Matlab codes**: For the 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 structural 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%).

Publications

Published 2 articles in international scientific journals and one article in a conference. 2 more articles in preparation.

Personal vitae

Date of birth	31 October 1991
Sex	Male
Nationality	Indian
Languages	English (C2 - fluent)