Harshil Pisavadia

MSc in Mechanical Engineering | Engineer In-Training

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pisavadi@ualberta.ca +1 780 271 3845 Edmonton, Alberta, Canada Canadian and Australian Citizen

Technical Skills

Finite Element Analysis (FEA)	LS-DYNA, HyperWorks, ABAQUS, ANSYS
Computational Fluid Dynamics (CFD)	ANSYS, STAR-CCM+
Programming	MATLAB, Python, Bash, LATEX, SMath, Mathematica, Visual Basic, AutoHotKey
3D Modelling	SolidWorks, Blender, AutoCAD/Inventor, CATIA

Projects

Development of a Dynamic Failure Model for Polymeric Adhesives

April 2020 - Today

Centre for Design of Advanced Materials One Slide Summary

Developing a cohesive zone finite element model to simulate the dynamic failure of adhesives used in hybrid armor systems for land vehicles under high-velocity ballistic impact using LS-DYNA simulation software package. This project is in collaboration with General Dynamics Land Systems, NP Aerospace, and Defence Research and Development Canada (DRDC).

LS-DYNA | HyperWorks | Blender | SolidWorks | Python | MATLAB | Bash

Heavy-Duty Compressed Natural Gas Fuel Rail Design

May 2019 - August 2019

Poster

Led a team of five students to pioneer the design of a compressed natural gas fuel rail for heavy-duty diesel engines to be installed in a full-scale dual-fuel semi-trailer truck.

- Complied with ASME/BPVC, NGV 3.1, and ISO 15500 standards to define design parameters
- Performed detailed stress and deformation analysis of the fuel rail using ANSYS to locate high stress concentrations zones
- Conducted CFD analysis inside fuel rail to determine the flow and temperature distribution using the ANSYS CFX module
- Prepared reports containing cost estimates, 3D renders and detailed drawings of the prototype, and safety requirements

SolidWorks | ANSYS | SMath

Professional Experience

Today – April 2020 | Center for Design of Advanced Materials – Dr. James Hogan's Research Group, Edmonton, AB

Modelling Team Lead

- Leading the CDAM modelling team to develop a state-of-the-art system-scale hybrid armor model
- Simulating high-speed ballistic impact events on a full-scale hybrid armor model using LS-DYNA with parallel and cluster computing (bash scripting in Compute Canada)
- Automating the 3D model generation of ceramic tiles taking into account manufacturing defects (e.g., tolerances and adhesive seepage) using Blender coupled with Python scripting
- Communicating research output to industrial collaborators and academics through presentations in monthly Alliance Science meetings and biweekly group meetings
- Leading biweekly writing workshops by mentoring graduate students to improve their article and thesis writing skills
- Assisting the Principal Investigator in project and research management, including proposal drafting, budgeting, and scheduling

December 2019 – April 2019

Research and Development Engineer Intern

Collaborated with Milburn Mountain Defense and DRDC to design armor plates and platens:

- Used SolidWorks and CATIA to create 3D models and drawings of armor plate assemblies
- Communicated with collaborators through presentations and detailed technical reports highlighting updates to the design and methods used (e.g., coordinate-measuring machine, 3D scanner)

Collaborated with US Army Research Laboratory and DRDC for Synthetic Microstructure Project:

- Performed MATLAB processing of material microstructures for next generation material development
- Generated 3D representations of secondary phase particles using statistical distributions by assigning orientation angles, distances, and methods to populate them using MATLAB

December 2019 – September 2019 | **Alberta Health Services, Edmonton, AB**
Engineer Intern
- Involved in the development of an osseointegration prosthetic limb protoype using reverse engineering techniques by 3D scanning, instrumentation techniques, and 3D modelling with SolidWorks
- Performed dynamic analysis of a bone anchored hearing aid implant model using ABAQUS

January 2019 – September 2018 | **International Cooling Tower (ICT), Edmonton, AB**
Engineer Intern
- Created cost estimate templates using VBA within Excel for sections of a crossflow cooling tower (e.g., fan deck, louvers, sealants, stairways) taking user inputs of overall dimensions and materials
- Designed and developed detailed drawings of a sample testing rig using AutoCAD to analyse nozzle spray patterns and ensured strict company safety protocol under its operation
- Modified and updated ICT design standards using AutoCAD, ensuring design constraints are satisfied
- Reviewed, identified, and eliminated discrepancies in engineering drawings of a multi-million-dollar cooling tower project using AutoCAD

May 2018 – August 2018 | **Dr. Morris Flynn's Research Group, Edmonton, AB**
Research Assistant Participated in "Minimizing the Visible Plume Produced by Cooling Towers" research project in collaboration with ICT":
- Developed conceptual designs of a counterflow cooling tower's plenum chamber using SolidWorks
- Converted a coaxial plume MATLAB model to Python programming language

December 2017 – May 2016 | **Dr. Arthur Mar's Research Group, Edmonton, AB**
Research Assistant
- Developed a AutoHotKey script to efficiently export >300,000 crystallographic information files from Pearson's Crystal Database saving several months of processing time and funds to hire personnel
- Presented research output of "Frustrated Machine Learning : The Case of Polymorphism in Titanium Iron Phosphide" at North American Solid-State Chemistry Conference 2017

Education

August 2022 – September 2020 | **Master of Science in Mechanical Engineering**
University of Alberta, Edmonton, Alberta, Canada
- Cumulative GPA: 4.0/4.0
- Thesis title: Development of a Dynamic Failure Model for Polymeric Adhesives used in Hybrid Armor Systems for Land Vehicles

Cohesive Zone Modelling | Impact Dynamics | Finite Element Analysis | Fracture Mechanics | Statistical Mechanics

April 2020 – September 2015 | **Bachelor of Science in Mechanical Engineering Co-Op, Mathematics Minor**
University of Alberta, Edmonton, Alberta, Canada
- Cumulative GPA: 3.8/4.0
- Graduated with Distinction
- Capston project: Heavy-Duty Compressed Natural Gas Fuel Rail Design

Computational Fluid Mechanics | Structural Design | Thermodynamics

Publications

- **Pisavadia H**, Toussaint G, Dolez P, Hogan J. Cohesive Zone Failure Modelling of Polymeric Adhesives used in Armor Systems. *International Journal of Impact Engineering*. (Submitted October 2021).
- Mohamed M, **Pisavadia H**, Westover L. Dynamic Analysis of the Bone Anchored Hearing Aid System using Finite Element Method. *Journal of Biomechanics*. 124(2). (2020).
- Oliynyk A, Adutwum L, Rudyk B, **Pisavadia H**, Lotfi S, Hlukhyy V, Harynuk J, Mar A, Brgoch J. Disentangling Structural Confusion through Machine Learning: Structure Prediction and Polymorphism of Equiatomic Ternary Phases ABC. *Journal of the American Chemical Society*. 139(49): 17870-17881. (2017).

Additional Information

- Proficient in English and Gujarati
- Member of the Nautical Research Guild
- Interests: Model ship building; Gardening; Health and Fitness; Cooking