

Maral Alyari

Product Design Engineer

Experienced product design engineer with expertise in **high-precision engineering**, **concept-to-production product development**, and **automation** in cutting-edge research industry. Unique background in **mechanical design engineering**, **physics** and **data analysis**, along with strong leadership, teamwork, and self-driven determination.

About

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Key Skills

Product Design

CAD/CAM Modeling

BOM-DFM/DFA/DFMA

FEA (Static Structural, Thermal)

Tolerance Analysis (GD&T)

High Precision Engineering

Rapid Prototyping Techniques

Design of Experiments (DOE)

Quality Assurance & Quality Control

Material Selection and Testing

Data Analysis

Root Cause Analysis

Cross-functional Collaboration

Technical Documentation

Electromechanical System Integration

Semiconductor Devices & Detectors

Cleanroom & Facility Management

Technical Software

Siemens NX

NXOpen | SNAP

ANSYS

PLM (Teamcenter)

ROOT

git

Programming Languages

C++

Python

Visual Basic

LaTeX

LabVIEW

Professional Experience

Fermi National Accelerator Laboratory (Fermilab)

Application Physicist

May 2020 - present

Primary focus: **DFM/DFA/DFMA**, **prototyping & assembly/production line preparation to build the CMS Calorimeter to be installed at LHC**.

- Designing high-precision detector components, creating 3D models and engineering drawings with CAD/CAM software, adhering to industry standards.
- Developed a custom NXOpen API application for automating 3D model creation of 108 complex detector components, enhancing project flexibility while conserving resources.
- Designing, building prototypes, and conducting in-depth failure analyses to optimize product designs, material processing, manufacturing techniques and to qualify vendors.
- Performing FEA thermal analyses to target the optimal operating temperature range for detecting devices.
- Applying DFM and DFA principles to optimize production processes, reduce costs and enhance assembly efficiency.
- Optimized production QA/QC by automating CMM/OGP measurements, statistical analyses, and data-driven corrections, enabling real-time quality checks.
- Proactively presenting at the design reviews in a cross-functional collaboration.

Postdoctoral Research Associate

March 2017 - May 2020

Primary focus: **R&D, designing & advancing conceptual designs to build the CMS Calorimeter to be installed at LHC**.

- Led complex end-to-end product design, including mock-up creation and failure mode testing, ensuring design feasibility, functionality, and manufacturability.
- Accelerated CMS calorimeter upgrade R&D project, achieving international milestones, demonstrating exceptional project development.
- Performed stress and thermal FEA analyses to optimize material selection, validate stresses, and establish tolerances for delicate detector components.
- Mentored students, authored technical documents & scientific papers, and presented research findings at national/international conferences.

State University of New York at Buffalo

Research Assistant

August 2013 - March 2017

Primary focus: **production phase of the CMS Pixel tracker installed at LHC**.

- Assisted in designing and validating tooling using rapid prototyping techniques.
- Developed detailed installation guidelines to facilitate detector integration and installation.
- Ran thermal and reliability tests on production detector pixel modules before installation.
- Contributed to the assembly and integration of electro-mechanical detector components.

Education

• Passed **FE Mechanical Engineering Exam** | NCEES

July 31st, 2023

• Ph.D. in **High Energy Physics** | SUNY at Buffalo

February 1st, 2017

• M.Sc. in **Physics** | SUNY at Buffalo

September 1st, 2014

• B.Sc. in **Solid States Physics** | University of Tehran

October 22nd, 2009