Sara Sourani

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Summery

- Experienced and versatile engineer with expertise in CATIA, SOLIDWORKS and MATLAB. Proficient in mechanical, electrical, and software skills, including operating multiple 3D printers, CNC machines, Mission Planner, Swift Console, ROS, Gazebo, and Arduino. Notable achievements include optimizing an autonomous vehicle chassis using Finite Element Method, SOLIDWORKS and MATLAB for jungle navigation, and serving as an Additive Manufacturing Specialist fulfilling over 200 print requests. Proven abilities in cost-effective CNC machine design, designing a functional walking mechanism for a dinosaur model displayed at the Museum of Idaho, autonomous navigation development and its charging system for agricultural robots, and teaching assistance in mechatronics, kinematics, and machine design.

Education

M.Sc. in Mechanical Engineering — **Idaho State University** — *Idaho, USA* — **01/2023 - 12/2024**

- GPA: 3.8/4

B.Sc. in Mechanical Engineering — **Isfahan University of Technology, Ranked 8th in IRAN** — *Isfahan, IRAN* — **2015 - 2019**

- Last Year GPA: 3.5/4

Skills

CAD

- **CATIA** | **SOLIDWORKS (FEM & CFD)** | Industrial Drawing | Meshmixer employed in diverse projects as detailed below.

Mechanical, Electrical & Software

- **3D Printers** – *Up to five software using for 3d printers* | **ABB Robot** | CNC Machine | MATLAB | Mission Planner | Swift Console | ROS | Gazebo | Arduino | Universal GCode Sender | Wiring

Experience

Mechanical Engineer – Wireless Charging — **Ecological Research** — *Idaho, USA* — **Summer 2024**

- Developing a wireless charging system mounted on an autonomous vehicle (Flex) to power two quadcopters—one designated for mapping and the other for sample collection in a jungle environment.

Mechanical Engineer CPI – Suspension Mechanism — **Idaho State University** — *Idaho, USA* — **Summer 2024**

- Optimizing and elevating the design of a double wishbone suspension mechanism for a specific Mercedes-Benz vehicle. The results will be submitted to the **Nature Journal**.

Mechanical Engineer – Chassis — **Ecological Research** — *Idaho, USA* — **2023 - Current**

- A **grant** from CERE was awarded to **design a chassis** of an autonomous vehicle for **quadcopter charging** through optimization using **finite elements, MATLAB,** and conducting stress analysis using **SOLIDWORKS**. This study introduces "Flex", a groundbreaking autonomous vehicle tailored for jungle navigation and the paper of that has received approval for publishing in **ASME 2024 International Mechanical Engineering Congress and Exposition (IMECE2024).**
- Building and printing the chassis of Flex using the **big meter Modix large 3d printer**.
- Designing a **suspension mechanism** that is attached to the chassis and has the ability to change the height of Flex. That would contribute to a 30%increase in research projects focused on AGVs for challenging terrains.

3D Printing Lab — **Idaho State University** — *Idaho, USA* — **01/2023 - Current**

- Operating of more than six distinct types of **3D printers**, such as Stratasys, Markforged, Raise3D E2, Raise3D Pro2, and utilizing a variety of materials such as ABS, PLA, Carbon Fiber, PC, PVA, QSR, has led to the successful fulfillment of over 200 print requests.
- Assembled the **Modix large 3D printer** with significant dimensions within one month.

Mechanical Design Engineer CPI for Dinosaur Model Designing — **Museum of Idaho** — *Idaho, USA* — **05/2023 - 08/2023**

- Developing of a functional walking mechanism for the dinosaur using **SOLIDWORKS**, Meshmixer and **3d printer** technologies to create a distinctive dinosaur model intended for display at the museum which was funded up to $20000. The paper of that has been accepted for publication in **ASME 2024** and the poster was presented at the **IEEE Conference.**

CAD Engineer – CNC Machine | **Idaho State University** | *Idaho, USA* | **01/2023 - 05/2023**

- Designed the mechanical components of the **CNC machine** using **SOLIDWORKS** aimed to optimize cost and reduce the complexity of the bulky-sized engraving machine, providing cost savings of up to 50% for modifications made during the prototyping compared to post-mass production adjustments, enhancing efficiency in wood cutting.
- Utilized the **Arduino** board powered by GRBL firmware to control stepper motors in the CNC machine, **Universal GCode Sender** (UGS) streamlines G-code handling and facilitates real-time monitoring and automation.
- Building a prototype of a CNC machine with 3D-printed SolidWorks components and a welded base achieved a 25% cost reduction, 20% faster design iterations, and 30% improved assembly precision.

Mechanical Engineer – Designer | **Sefahan Ventilation Technologists Company** | *Isfahan, IRAN* | **01/2019 - 05/2022**

- Designing and executing of mechanical installation projects including thermal and refrigeration installation of the engine room and piping.

Automotive Researcher | **Idaho State University** | *Idaho, USA* | **01/2023 - 05/2023**

- Engaging in the development of autonomous navigation for an agricultural robot using RTK GPS and Pixhawk, including the creation of a wiring diagram for the AGV robot with RTK GPS and Pixhawk integration, utilizing **Mission Planner** (GCS) and **Swift Console** software.

Courses | **Idaho State University** | *Idaho, USA* | **01/2023 – 05/2024**

- **Computer Simulation I(FEM) – Computer Simulation II(CFD) – Adv Kinematics and Robot Arm – Mechatronics.**

Projects

- **IEEE Conference: Material Selection for a Custom Chassis Design** — *Publishing in Progress* — **(03/2024)**
- **IEEE Conference: Poster Presentation on "Designing a Robotic Dinosaur Skeleton".** — **(03/2024)**
- **ASME Conference: Optimizing Chassis Design for Autonomous Vehicles Based on Finite Element Analysis and Genetic Algorithm.** — *Under Review* — **(04/2024)**
- **ASME Conference: Advanced material selection and design strategies for optimized robotic systems.** — *Under Review* — **(04/2024)**
- **ASME Conference: Design and Development of an Oryctrodromeus-Inspired Robotic Dinosaur Skeleton.** — *Under Review* — **(04/2024)**

Honors and Awards

- **Grant:** **(2023-2024)**
  A grant from CERE was awarded to design a chassis of an autonomous vehicle through optimization using finite elements, MATLAB, and conducting stress analysis using SOLIDWORKS. This study introduces "Flex", a groundbreaking autonomous vehicle tailored for jungle navigation.
- **Received Non-Resident Tuition Waive,** Idaho State University **(2023-2024)**
- **Received a full scholarship, Tuition Waive,** Isfahan University of Technology **(2015-2019)**
- **Ranked 4% among +142,000 applicant in Iranian National University Entrance Exam** **2015**