

# Sudan Baral

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## EDUCATION

Kansas State University — PhD in Biological & Agricultural Engineering, Field Robotics (2025–Present)  
Research focus: Field robotics, under-canopy autonomous systems, ROS2/Isaac Sim, perception and controls.

Kathmandu University — BE in Mechanical Engineering (2018–2022)

## RESEARCH INTERESTS

- Field robotics and autonomous systems
- ROS2, Isaac Sim, and computer vision for agriculture
- Additive manufacturing and mechanical metamaterials
- Precision farming

## RESEARCH & PROJECT EXPERIENCE

### **Autonomous Skid-Steer Robot for Under-Canopy Agriculture, Kansas State University 2025–Present**

- Designed and fabricated a Skid-steer robotic platform for row-crop environments.
- Modeled vehicle kinematics in MATLAB and integrated ROS2-based navigation.
- Developed perception and controls pipelines with multi-camera/IMU sensing.

### **Design and Development of Prosthetic Knee using Hybrid Manufacturing 2023–2024**

- Manufacturing modes and materials testing for prosthetic knee.
- Knee joint design and loading simulations (ISO 10328).
- Conducted static and fatigue testing of prototypes.

### **Design of Force Sensitive Resistor (FSR) Embedded Insole for Gait Analysis 2021–2023**

- Designed and fabricated FSR embedded insole for gait phase detection.
- Programmed ESP-32 in Python; applied ML classifiers (Logistic regression, Decision Tree, SVM).
- Presented at University Scholar Conference, Kathmandu University.

## PROFESSIONAL EXPERIENCE

Mechanical Design Engineer, Calcgen Solutions, Nepal 2023–2024

- Designed ASME Section VIII Div 1/2 compliant pressure vessels.
- Proficient with COMPRESS and PV Elite.

Internship: Calcgen Solutions (Mechanical Design Engineer Trainee) Jan–Mar 2023

- Drafted pressure vessel drawings in AutoCAD.
- Studied BPVC and ASME code applications.

Research Assistant, Design Lab, Kathmandu University 2022–2023

- Contributed to development of prosthetic knee for children under 5.

## **PUBLICATIONS**

1. Sudan B., Isha A., Shrestha P.L. Bholia T. (2025). Multi-process manufacturing framework: A cost-effective approach for pediatric prosthetic knee joints in above-knee amputations.  
<https://doi.org/10.1016/j.hybadv.2025.100450>
2. Sudan B., Upama P. Amit G. Pratisthit S.(2022). Design of force sensitive resistor (FSR) embedded insole for phase detection during human gait and its classification. Journal of Physics: Conference Series (IOP). 10.1088/1757-899X/1314/1/012008

## **SKILLS**

- CAD/Simulation: SolidWorks, ANSYS, OpenFOAM
- Robotics: ROS2 , Isaac ROS/Sim, SLAM, ODrive
- Programming: Python, C++, MATLAB
- Documentation: MS Office, LaTeX, Mendeley, EndNote

## **LEADERSHIP & AFFILIATIONS**

- Executive Member, Nepalese Student Association – Kansas State University (NSA-KSU) 2025–Present
- President, Students for the Exploration and Development of Space – Kathmandu University (SEDS-KU) 2022–2023

## **LANGUAGES**

Nepali (native), English (fluent)