# PALLAB LAYAK

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## EDUCATION

**University of Illinois at Urbana-Champaign (UIUC)** **2022 - December 2025**

Mechanical Engineering B.S., Minor in Mathematics | **Senior** | Technical GPA: **3.98/4.0** | Cumulative GPA: **3.96/4.0**

**Achievements –** 1st Place at Formula Sun Grand Prix '25, 4th Place at American Solar Challenge '24, Engineering Visionary Scholarship Recipient, Dean's List 6 Semesters

## TECHNICAL SKILLS

**CAD Modelling and Analysis –** Siemens NX, SolidWorks, Fusion360, Creo Parametric, ANSYS

**Hardware and Machining –** Manual Mill, Manual Lathe, Waterjet, Welding, 3D Printing, Arduino, Composite Fabrication

**Coding –** MATLAB, Python, Java, JavaScript, LaTeX

## TECHNICAL CLUBS AND ORGANISATIONS

**Illini Solar Car** **2022 - Present**

*Lead Mechanical Engineer (24 – 25), Dynamics Lead & Student Advisor (25 – 26)*

- **Maximized pre-preg laminate stiffness-to-weight performance** by designing and executing **ASTM-compliant** tensile, shear, and flexural testing on **50+ coupons** to characterize laminate properties for FEA-driven optimization.
- **Reduced chassis weight by 30%** from previous generation by performing structural analysis using ANSYS and applying solid mechanics principles (beam deflection, stress analysis) to minimize deformation under loading.
- **Led a 70+ student mechanical team and coordinated 30+ projects**—suspensions, chassis, battery housing, brakes, seat, aero-shell—to ensure seamless integration and on-schedule delivery.
- **Achieved 40% weight reduction** while redesigning trailing-arm suspension mounts by solving statics models analytically using Python and analyzing iterations using ANSYS FEA and topology optimization.

*Electromechanical Lead (23 – 24), Mechanical Pit Crew Member (2024)*

- **Ensured safe integration of electrical PCBA's** by developing 3 enclosures and conducting preliminary 1D heat transfer calculations with integrated heat sinks, using parametric modeling in Siemens NX for rapid prototyping.
- **Streamlined CAD file management for 500+ parts** by developing a JavaScript-integrated database in Google Sheets, reducing design mis-references and review time.
- **Manufactured 20+ potted inserts** on manual lathe and mill, ensuring secure integration of critical components.
- Achieved a **4th place finish at the 2024 American Solar Challenge** by devising rapid mechanical fixes using root cause analysis and hands-on implementation.

## WORK EXPERIENCE

**Senior Capstone Project – thyssenkrupp Dynamic Components** **2025**

- Achieved a **30% productivity increase** by **reducing assembly line downtime to <1%** in camshaft auto feeder system.
- Optimizing the narrowing conveyor section to minimize jams by creating **GD&T**-detailed drawings and performing **RSS and Six Sigma** tolerance stack-up analyses to define ideal tolerances.
- **Reduced line jams by 8%** by integrating a pneumatic vibrator for conveyor walls - performing dynamic analysis to determine required load rating, and fatigue analysis to determine lifetime of assembly-line components.

**Non-Newtonian Fluid Mechanics and Rheology Research Lab – Ewoldt Research Group UIUC** **2024 - Present**

*Undergraduate Researcher*

- **Eliminated 100+ hours of manual monitoring** by automating fluid extrusion using an Arduino Nano interface between printer fan output and pump.
- **Programmed 9 custom G-code files** using Python scripts to enable 3D printing of complex lattice structures in a gel bath.
- **Reduced testing time by 75%** by designing and fabricating an automated testing setup for fluid impact strength testing.

**Indian Institute of Science - Professor Satish V. Kailas** **2023**

*Research Intern*

- **Prepared 30+ friction-welded samples for SEM Imaging**, ensuring high-quality surface finish for defect inspection.
- Conducted **tensile stress tests on 10+ linear friction-welded samples**, documenting stress-strain and deformation behavior, and fracture characteristics in heat-affected zone.