

# Essey Araya

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## SUMMARY

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Sophomore Engineering Physics and Computer Science student at Berea College with experience in mechanical design, electronics, data analysis, and software development. Background includes composite design and testing for solar car projects, simulation-based optimization, and hands-on manufacturing, alongside building scalable web applications, data pipelines, and AI tools to solve practical, real-world problems.

## EDUCATION

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**Berea College | Berea, KY**

Expected: Dec 2027

Bachelor of Science in Engineering Physics and Computer Science, Minor in Math, **GPA: 3.95**

- **Relevant Coursework:** Differential Equations, Vector Calculus, Numerical Analysis, Classical Mechanics, Thermal Physics, Advanced Lab, Physics I & II with Calculus, Power and Energy Systems, Data Structures and Algorithms
- **Honors & Awards:** 4-year tuition promise scholarship (\$200,000+ USD), Dean's List (all semesters)

## SKILLS

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**Mechanical Design:** 2D & 3D CAD(Autodesk Inventor), FEA (Ansys, Altair Inspire), GD&T, Tolerance Analysis, DFM

**Electronics:** OpAmps, Amplifier Circuits, Signal Conditioning, Microcontrollers, Sensors, Stepper-motor, Oscilloscope

**Prototyping & Manufacturing:** 3D Printing, Composite Layup, Mold making, Universal Testing Machine, CNC

**Programming:** Python, C++, MATLAB, SQL, JavaScript, Git, GitHub, Linux, Object Oriented

**Data and AI:** NumPy, Excel, Jupyter, Matplotlib, Pandas, IBM Cognos, SQLite, REST API, Web Scraping, Groq API, AI Agent

**Frontend:** HTML, CSS, SASS, SCSS, PostCSS, React, NPM, JSX, Netlify CI/CD, Agile, Functional Programming

## EXPERIENCE

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**Chassis Team Lead - Lab Associate,** Berea College – KY

Aug 2025 – Present

- Led a 3-member team to optimize chassis design, reducing weight by 32% while ensuring safety compliance
- Conducted 50+ FEA simulations using Altair Inspire and validated critical load cases through hand calculations
- Developed manufacturing-ready 3D models with proper tolerances and considerations for machining and welding

**Physics Teaching Assistant,** Berea College – KY

Aug 2025 – Present

- Tutored 15+ students in introductory physics by breaking down complex concepts into clear explanations
- Held targeted review sessions for students struggling with course material, increasing exam passing rates by 15%

**Composite Team Lead - Research Assistant,** Berea College – KY

May 2025 – July 2025

- Led a 2-member team in creating a lightweight composite battery box that met structural and insulation requirements at 50% of the projected cost through ANSYS simulations, and Mechanical testing with a UTM
- Eliminated 80% of testing costs by designing composite layups and conducting FEA in Ansys Mechanical
- Built small-scale composite prototypes to verify manufacturability, surface finish, and structural performance
- Reduced mold production time by 20+ hours and avoided CNC tooling costs by using a PLA 3D-printed pattern
- Maintained 10+ lab tools and organized an inventory of 50+ prototyping materials to streamline workflow

**Software Developer,** Biscuté – Addis Ababa, Ethiopia

Feb 2024 – Present

- Built a responsive end-to-end e-commerce website using HTML, SCSS, JavaScript, and PostCSS (for cross-browser compatibility), reducing product onboarding time by 50% and expanding customer reach (biscute.netlify.app)
- Designed pixel-perfect, reusable components and deployed the site on the cloud using Netlify CI/CD
- Optimized performance to ensure under 2-second loading times despite low-bandwidth conditions in Ethiopia
- Generated \$5000 in revenue in a year, which led to two additional clients through referrals
- Leveraged Copilot-assisted testing to speed up maintenance checks and cut debugging time by around 30%

## PROJECTS

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- Electromyography Signal Acquisition** | OpAmps (LF353), Oscilloscope, Multistage Circuit Oct 2025 - Dec 2025
- Designed and built a multi-stage EMG amplifier system to acquire tiny bioelectric signals from the muscle
  - Characterized and validated system gain and bandwidth across varying muscle loads through controlled testing
- Light Diffraction Measurement** | Microcontroller, Stepper Motor, Linear Guide, Python Sep 2025 - Oct 2025
- Automated light intensity measurements using a microcontroller, NEMA stepper motor, linear guide, and sensor
  - Achieved 0.009 mm positional resolution, collecting precise light intensity data to plot the interference pattern
- Jack Stand** | Autodesk Inventor, Bambu 3D printer etad-130.my.canva.site/essey-presentation
- Designed and 3D printed a jack stand with a detachable handle using Inventor to improve part replacement
  - Reduced cost to \$0.38 and waste to 6% by optimizing print parameters and material usage across prototypes
- Technology Trends** | Python, SQL, NumPy, Pandas, Matplotlib, Excel, IBM Cognos github.com/essey1/tech-trends
- Developed Python and SQL pipelines to ingest, clean, and analyze datasets containing 10,000+ job postings
  - Identified trends, correlations, and outliers through quantitative analysis and visualization using Jupyter
- Movie Posters Vault** | React, HTML/CSS, JSX, OMDb REST API movie-posters-vault.netlify.app
- Developed a scalable movie search engine using React and the OMDb REST API with reusable JSX components
  - Built reusable, responsive, and polished UI components with asynchronous API fetching and error handling
- AI Debugger Agent** | Python, Groq LLM API github.com/essey1/ai-debugger
- Developed an AI-powered debugger that analyzes code, detects errors, and provides AI-generated suggestions.
  - Successfully analyzes 500+ lines of code per run, dramatically reducing debugging time
- Train Ticket Booking App** | HTML, CSS, JavaScript, jQuery, Bootstrap essey1.github.io/book-your-train-ticket
- Built a web app for booking train tickets, using jQuery to manage dynamic form flow and ticket generation
  - Added real-time price calculation and class-based pricing logic with JavaScript to enhance user experience

## EXTRACURRICULAR

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- Vice President**, Berea Engineering and Racing (BEAR) – Berea College, KY May 2025 – Present
- Led 5+ engineering workshops and collaborative builds to mentor members in CAD, FEA, and prototyping
- Career Prep Fellow**, Management Leadership for Tomorrow Jan 2026 - Present
- Accepted into a selective 18-month professional development program that accelerates the career growth of emerging leaders through structured coaching, mentorship, and targeted skill-building
- Member - Drone Flight Dynamics**, Math Modelling Club – Berea College, KY Dec 2025 – Present
- Studying propeller–air interactions and evaluating design parameters for efficient thrust generation using CFD
- Member**, Google Developer Student Club, Berea College – KY Oct 2025 – Present
- Participated in weekly DSA problem-solving sessions, solving 5 to 10 algorithm challenges per week
- Early Insights Program Participant**, Morgan Stanley Oct 2025 - Dec 2025
- Gained exposure to investment banking, firm culture, and career pathways through workshops.

## CERTIFICATIONS

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- Georgia Tech**, Mechanics of Materials I Certificate – Coursera, online
- Vanderbilt University**, Programming with MATLAB Certificate – Coursera, online
- DeepLearning.AI & Stanford**, Supervised Machine Learning Certificate – Coursera, online
- IBM**, Data Analyst Professional Certificate (ACE credit rec.) – Coursera, online
- Google**, IT Support Professional Certificate (ACE credit rec.)– Coursera, online