

Keshav Anand — Full Portfolio

7th Grade

Schimelpfenig Middle School, Plano

August 2021 – May 2022

- Algebra I Honors (MR): [99, 99]
- Band: Solo Contest Distinguished in City as Flute Player
- American Football B-Team (4th String) Quarterback and Safety (10+ hrs/week)
- School Cross Country Team Member (10+ hrs/week)
- Robotics — Joined school robotics club as programmer
 - Only programmer after COVID, build code from scratch
 - Won first place in local qualifier and semi qualifier (no regional advancement)
- MATHCOUNTS and AMC math competitions — no awards
- Whiz Quiz (Trivia) Team Captain — 3rd Place in City
- Science Fair Honorable Mention at District Level
 - Using Valakku Tiri (Cotton Wick) for Self Watered Plant (Capillary Action)
- Speech and Debate Local Tournaments — 5th in Musical Pantomime (Acting), Public Forum Debate 5th

Extracurriculars and Hobbies:

- Carnatic Vocal Music — Performed in One Major Concert; Started Self-Taught Carnatic Keyboard
- Cricket — 20 Hours a Week, Competed in Local and National Tournaments; U13
- Chess classes with VAV Rajesh IM, no tournaments (ELO 1100)
- Dropped Western Piano — learned for 7 years
- Baseball starting pitcher for club team
- Started self taught bass guitar on \$80 bass guitar — no shows or awards
- Self taught Carnatic Keyboard — Using portamento and mono legato for gamakams
- Competitive Math Classes
- Started baking eggless cakes as a hobby with family — no sales or awards
- Started passion for hiking in national and state parks
 - Caprock Canyons, Palo Duro Canyon, Big Bend National Park
- Started arranging music
 - Created arrangements for Garage Arts Project (Vasupradha Raghav), mixing Carnatic and Western notes
 - Recreated popular Tamil songs as Kareoke / Cover tracks (Konjum Mainakkale, Thoda Thoda, Endhan Nenjil, etc.)

8th Grade

Schimelpfenig Middle School, Plano

August 2022 – May 2023

- Geometry Honors (MR): [98, 100]
- Band: Band Flute Lead, UIL All Region 14th Chair Flute, Solo Contest Distinguished in City, Played in Numerous Band Solos
- American Football B-Team (3rd String) Quarterback and DB (15+ hrs/week)
- School Cross Country Team Member (10+ hrs/week)
- Robotics — 2nd Year FTC School Team
 - Coded basic driver controlled system, vision processing for autonomous
 - Won first place as alliance captain in local qualifier, ahead of all other area middle school teams
- Competition Math — Represented school in MATHCOUNTS State, ranking in top 60 of Texas (2nd in Region)
- Whiz Quiz (Trivia) Team Captain — First Place in City, District Recognition

- Science Fair First at School Level (Did not participate further)
 - Using a non-Newtonian fluid (Oobleck) to create a shock absorbing material for knee pads
 - Tested with egg drop tests
- Speech and Debate Local Tournaments (No Award)

Extracurriculars and Hobbies:

- Carnatic Vocal Music — Performed in One Major Concert
- Carnatic Keyboard — Played for major Bharatanatyam dance performance
- Cricket — 20 Hours a Week, Top Leg SPinner in Dallas — Represented City in Southwest U15 Zonals
- Started chess tournaments, dropped coaching (ELO 1250 USCF)
- Started producing true arrangement covers, getting input from Music Director Girishh Gopalakrishnan
 - Started solo unplucked arrangements, using MIDI for all tracks
- Dropped Baseball to focus on Cricket
- Continued bass guitar self taught (on and off)
- Continued hiking during holidays
- Got a perfect score (101/100) in Texas Music Teacher's Associated Music Theory Test
- Started learning carnatic mridangam from Vid. Raju Balan
 - Learned basic sollukai patterns and konnakol

Summer:

- Represented Dallas nationally in U15, U13 cricket tournaments
 - Won best bowler in U13 Independence Day tournament
- Performed in Carnatic Vocal Concert, and small carnatic keyboard accompaniment gigs
- CBE Algebra II — [96, 96]
- CBE Health [87]
- E School Lifetime Witness Semester I [96]
- CBE Tamil via Avant for 4 Language Credits
 - 100 in Reading, 100 in Listening, 99 in Speaking, 85 in Writing
- Continued baking eggless cakes as a hobby
- Started binge watching many Tamil movies (old to new)
- Continued producing music arrangements, learning live mixing in Garage Arts Project Dallas Exhibition

9th Grade

IB World School @ Plano East Senior High School, Plano

August 2023 – May 2024

- PreCalculus Honors: [98, 98]
 - AP not offered at time
- AP Human Geography: [99, 100]: AP 5
- English I Honors: [99, 100] (blocked with AP HG)
- Biology Honors: [99, 97]
- AP Computer Science Principles: [100, 99]: AP 5
- Debate I: [100, 99]
- Introduction to Engineering Design: [97, 99]
- Math Club Secretary — Competed in many competitions
 - AIME Qualifier from AMC 10
- Joined CS Club — First introduction to Java and competitive programming
- Debated in Extemporaneous Speaking, no further qualifications
- Member of School's Quiz Bowl Team (never competed)
- PSAT (8/9) Score 1440/1440 [720 Reading, 720 Math]

- Member of Plano East's Science Fair Club (see below)
- Participated in History Fair — Group Website on Arab Spring (no awards)

Simply Stir: Highlight Research Project

Sole Researcher

Project Portfolio ↗

- Developed a thermoelectric energy-harvesting system using a TEG for autonomous stirring.
- Designed a compact aluminum enclosure enabling efficient heat transfer and stable thermal gradients.
- Implemented electrical conditioning and load-matching to maximize TEG power extraction.
- Tested power delivery across various R_{LOADS} using Vernier Probes
- Performed thermal, electrical, and mechanical characterization across multiple cooking conditions.
- Conducted viscosity-based stirring tests and identified mechanical design improvements for high-torque fluids.

Qualified to **The International Science and Engineering Fair**, 1st in Engineering @ Dallas

Extracurriculars and Hobbies:

- Dropped Carnatic Vocal Music in favor of Mridangam
- Continued tinkering with Carnatic Keyboard — no performances
- Cricket during Fall, dropped during Spring
- Continued Arranging Music through covers and original compositions
- Continued bass guitar self taught
- Joined High Octavez Band as a Keyboardist
 - Performed in 2 major concerts, one in Fall and one in Spring
 - Over 250 hours put in learning sound reproduction for live playing
 - Ticketed concerts with over 1000 attendees, profits go to charity
 - Won presidential award silver for community service through band
- Started private FTC robotics team with friends — Technical Turbulence
 - Fully Custom Build (100% CAD) and Java Codebase from Scratch
 - Reached State Finals as globally top team in Tele-operated period
 - Lead/Sole SW Developer, coded custom vision pipeline for object detection
 - Learned advanced path-planning and odometry algorithms through libraries
 - Implemented advanced driver control features to improve driver performance
 - Mentored former middle school team (Quantum Claw)
 - Learned further implementations of Java through a wrapper SDK
- Learned LaTeX in creating professional documents

Summer:

- Performed in Carnatic Vocal Concert, and small carnatic keyboard accompaniment gigs
- E School Lifetime Fitness Sem 2 — [98]
- E School Chemistry — [98, 97]
- Started intensively playing card games (56) with family
- Continued Keyboard and Bass Guitar Arrangements
 - Collaborated with High Octavez member (Jeev Thomas) for novel arrangements
 - Moved to include Hindi and Malayalam songs in covers (in addition to Tamil)
 - Started singing in covers — brought in vocal techniques learned from carnatic music
 - Started tinkering with Machine Learning, self taught basics of Python
- Started moving away from library pathing in robotics, coding custom pathing algorithms
 - Learned about Bezier curves, cubic splines, and custom odometry implementations
 - Presented findings in FLYSET workshop (1000+ views), TI "Take Kids to Work Day" event

- Fractured left wrist while playing gully cricket at school
Completely halted my cricketing career (completely stopped playing)

10th Grade

IB World School @ Plano East Senior High School, Plano

August 2024 – May 2025

- AP BC Calculus: [98, 98]: AP 5 (on both sections)
- AP World History: [98, 99]: AP 5
- English II Honors: [98, 99] (blocked with AP WH)
- AP Env. Sci.: [97, 97]: AP 5
- AP European History: [99, 97]: AP 5
- Debate II: [99, 98]
- Engineering Science: [98, 98]
- Left Math Club and CS Club to focus on Robotics, Research, and Debate
- Debated in Extemporaneous Speaking, DUO Interpretation (Acting)
 - Qualified to State in Extemp (Domestic), won Local Tournaments in DUO
 - Qualified to Nationals in DUO Interpretation (1st in District) with Anshveer Kang
 - Piece was “Pom Pom Boys” — about showing respect for all factions
- Joined NHS as member (36 hrs volunteer work completed)
- PSAT (10) Score 1450/1520 [700 Reading, 750 Math]
- 9/10 President of Plano East’s Science Fair Club (see research below)

GaitGuardian: Highlight Research Project

Lead Researcher

[Project Portfolio](#) ↗

Met research partner, Viren Bankapur, by networking through ISEF 2024: Remotely collaborated on this project over Summer 2024 and the school year. GaitGuardian was Viren’s project at ISEF 2024, and I joined to help expand the system with my embedded systems and ML expertise.

- Built **GaitGuardian**, an end-to-end ML system aiding advanced Parkinson’s Disease patients.
- Designed a **custom PCB** and embedded stack with a 6-DoF IMU and ESP32-S3 for real-time sensing.
- Developed a **dual-attention CNN + biLSTM** model predicting Freezing-of-Gait up to 2s early.
- Created real-time algorithms for **fall detection** and **tremor classification** using IMU signals.
- Implemented a cloud-based **visual navigation module** with transformer object detection, depth estimation, and multimodal LLM scene descriptions.
- Optimized sensor pipelines via **signal filtering**, **feature engineering**, **oversampling**, and model tuning.
- Built two wearable devices (trunk and wrist) plus a BLE-connected **forehead camera** for vision tasks.
- Demonstrated performance exceeding existing FoG, fall, and tremor detection systems.

Won 3rd Place at **The International Science and Engineering Fair**, 2nd OVERALL in Dallas → over \$1500 won

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Character Traits and Personality

- Honest** and high **integrity**: helped catch cheaters in school multiple times.
- Inquisitive and Curious**: always asking questions and trying to learn more
- Hardworking and Determined**: Pushing myself to perfection in everything I do
- Creative Problem Solver**: Able to think outside the box and come up with innovative solutions
- Character Weaknesses**:
 - Can tend to overthink problems and overcomplicated solutions
 - Sometimes take on too much at once and struggle to prioritize tasks
 - Sometimes struggle with delegation and asking for help when needed
 - Can be overly critical of myself and others at times

Education

Plano East Senior High School, Plano
STEM and Multidisciplinary Endorsement

August 2023 – May 2027

- GPA: 4.73/4.0 ([View Unofficial Transcript ↗](#))
- Class Rank: **1/1273**
- Current Coursework:** AP Chemistry, American Studies (AP US History + AP English Language), Digital Electronics, AP Physics I, Calculus III (via Collin College)
- SAT: 1550/1600 — Reading 760/800, Maths 790/800

FTC Robotics

Lead Software Developer – Technical Turbulence (2023–Present) [Website](#) [Code Repo](#)

- Designed and implemented **custom inverse kinematics and path-planning algorithms** for precise autonomous navigation.
- Integrated **computer vision pipelines** for object classification using TensorFlow Lite
- Developed novel driver control enhancements to improve driver performance
- Optimized accuracy and real-time performance through efficient sensor usage
- Lead software **Top 30 Worldwide** for autonomous programming; reached FTC State Finals.
- Led software development, version control, and testing for a programming team of 4 members.

Skills

Programming Languages: Java, Python, Bash, C++ (Arduino), Kotlin (FTC), Limited HTML, JS, CSS

Programming Applications: Machine Learning, Signal Processing, Tensor Flow, Computer Vision

Miscellaneous: Public Speaking, CAD, PCB Design, Electrical, Competition Math

Other Activities

Vice President, LASER: Guiding and instructing 120+ students for Science Fair

Founder, Cricket Club: Former USA U15 Cricketer → Formed Plano East's first cricket team

Technology Officer, NHS: Coded and maintained React-based portal for largest NHS chapter in the US

Indian Film Music: Bass, Keys, and Arrangement, member of High Octavez [Original Music Library](#)