

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 Reigon)
- 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](#)