Anand, Keshav
52018302884

Center for Excellence in Education

Research Science Institute 2026

Keshav Anand
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Forms

Ia. Applicant Information

* indicates a required field

To be completed by applicant. Please provide complete and accurate details on yourself. If you did not enter your complete address and contact details upon account setup with Slideroom, please go back and do so now.

1. Name

Last Name (Surname)	First Name	Middle Name	Preferred Name
Anand	Keshav	Gopalan	

2. Date of Birth

Please enter in this format mm/dd/yyyy

07/03/2009

2.1. How old will you be on July 1, 2026?

While CEE does not discriminate on the basis of age, insurance and laboratory regulations require certain protocols based on age, and unfortunately our application system does not make it easy to calculate age based on birthdate above. Please select or enter your age on July 1 2026 as an integer, and it will be used only for these compliance purposes if you are selected.

16

3. Legal Sex

Please respond to this question with the sex that is indicated on your birth certificate, driver's license, or other similar government documents that are currently considered authoritative.

Male

4. Gender

Man

5. Permanent Address

Where you primarily live (may or may not be where you get mail) when not at school. If you attend a boarding school, please list your "home" address (if you have one that is different); you will be able to enter your school address later. If you split significant time between two residential addresses (e.g. between parents/guardians), you may enter both as rows.

Street	City	ZIP
3809 Sagewood Court	Plano	75025

6. State/Territory of Residence

Please list the state or territory where you permanently reside. If you attend a school out of state, you will have the chance to enter that in the next screen.

Texas

7. Country of Residence

United States of America (USA)

8. Country of Citizenship

If you are a citizen of multiple countries, please pick the one with which you most closely identify; however, if you are an American citizen, select United States.

United States of America (USA)

9. Current Secondary School Grade Level:

Select the applicant's secondary grade school level at the time of application:

11

10. Expected College Start Date

Please indicate the month and year you intend to begin college. You can select the first of the month by convention, if you are unsure what day of the month your college will begin.

08/01/2027

11. Home Phone Number {Example: (703) 555-1220; (011) 34 91 555-1220}

(972) 520-4390

12. Permanent Email Address

Give us an email address that will work for you indefinitely. Please do not provide school e-mail address.

keshavanandofficial@gmail.com

Ib. Family Information   * indicates a required field

Please complete this information for all parents/guardians and siblings. You may want to consult with a parent or guardian to make sure the information below is complete and correct.

1. Parent/Guardian 1 - Name, Gender and Relationship

Please enter the full name, including title (Ms., Mrs., Mr., Dr., etc.), for parent/guardian 1. Please also include their gender (female, male, other) and relationship (mother, father, guardian, etc.).

Title/Prefix	Given/First Name	Family/Last/Sur Name	Gender	Relationship

| Mr. | Anand | Gopalan | Male | Father |

2. Parent/Guardian 1 - Contact Details

Please indicate the preferred contact email and phone number for parent/guardian 1. If the student attends RSI, these will be used as emergency contact details.

Preferred Email	Preferred Phone
anand_rect@yahoo.com	(208) 283-5652

3. Parent/Guardian 1 - Address

For parent/guardian 1 listed above, please indicate address.

Street Address	City	State/Province	Postal Code	Country
3809 Sagewood Court	Plano	Texas	75025	USA

4. Parent/Guardian 1 - Occupation

Please indicate parent/guardian 1's occupation. If your parent 1 works multiple jobs, or holds multiple concurrent appointments, please list up to three.

Position/Title	Employer/Institution
System Engineer	Renesas Electronics

5. Parent/Guardian 1 - Education

Please list the highest degree of education attained by this parent.

Master's degree

6. Parent/Guardian 2 - Name, Gender and Relationship

Please enter the full name, including title (Ms., Mrs., Mr., Dr., etc.), for your second parent/guardian. Please also include their gender (female, male, other) and relationship (mother, father, guardian, etc.).

Title/Prefix	Given/First Name	Family/Last/Sur Name	Gender	Relationship
Mrs.	Chitra	Gopalakrishnan	Female	Mother

7. Parent/Guardian 2 - Contact Details

Please indicate the preferred contact email and phone number for parent/guardian 2.

Preferred Email	Preferred Phone
chithrag@gmail.com	(208) 283-5382

8. Parent/Guardian 2 - Address

For parent/guardian 2 listed above, please indicate address.

Street Address	City	State/Province	Postal Code	Country
3809 Sagewood Court	Plano	Texas	75025	United States

9. Parent/Guardian 2 - Occupation

Please indicate parent/guardian 2's occupation. If your parent 2 works multiple jobs, or holds multiple concurrent appointments, please list up to three.

Position/Title	Employer/Institution
Test Engineer	Texas Instruments

10. Parent/Guardian 2 - Education

Please list the highest degree of education attained by this parent.

Master's degree

11. Siblings

Please include the full name (First and Last), age and gender of your sibling(s). (Example: John Doe - 12 - Male)

Sibling Name	Age	Gender
Madhav Anand	12	Male

11.1. Are any of your siblings applying to RSI this year?

While we review applications independently, we want to be aware of the impacts of decisions we may make within the family.

No

12. Do you qualify for free/reduced price lunch?

In the United States, the National School Lunch Program (NSLP) provides eligible students with free or reduced-price lunch (FRPL) based on income. Students from households with incomes at or below 130 percent of the Federal poverty line can receive a free lunch.

No

13. Has anyone in your family previously attended a CEE program? If so, which program?

CEE programs include RSI and the USA BioOlympiad (USABO).

No

Ic. Secondary School Information   * indicates a required field

To be completed by the applicant or the applicant's guardian. If not known, this information should be publicly available from the applicant's secondary school:

1. Please enter your schools CEEB code:

Please enter or search for your secondary schools CEEB code. If your school does not have a CEEB code, please select "School not found" and enter your secondary school details.

445569 - Plano East Senior High School - Plano, TX, US

2. School Mailing Address

Street Address/POBox	Postal/ZIP Code	State	Country
3000 Los Rios Blvd	75074	Texas	United States

3. School Contact Info

Telephone number	Email Address	Website
(469) 752-9000		https://pesh.pisd.edu/

4. School Official

CEE requires the contact information of a leader at your school or district. This may be a Principal/Acting Principal, Headmaster or Head of School, Director, Superintendent, or other Chief Administrator.

Official's Title	Official's Full Name	Official's Email	Official's Phone #	Official's Prefix
Mr.	David Jones	david.jones@pisd.edu		

5. Do you attend school in the same state/territory as your permanent address?

Yes

6. Do you attend an DOD/APO AE/FP school?

The Department of Defense Education Activity, or DODEA, operates 160 schools serving K-12 students. DODEA's eight districts are located in 11 foreign countries, seven states, Guam and Puerto Rico. These schools may not have standard addresses or CEEB codes, so we try to make sure we can identify and annotate them correctly.

No

7. Comments (optional):

You may optionally add brief clarifying remarks here, for example if you attended multiple schools.

IIa. Applicant Research Preferences

* indicates a required field

The applicant should indicate first and second choices for research fields. These should be TWO DISTINCT FIELDS and the student should have some academic or research experience in them. For each of the two research field choices, select one sub-field within the chosen discipline. (Examples might be the sub-field of genetics within the field of biology; the sub-field of condensed matter physics within the field of physics, or the sub-field of number theory within the field of mathematics).

1. First Research Field:

Choose from one of the following, or else write in your own field. The RSI selection committee will look favorably at applications where the declared fields and sub-fields of interest align with the applicant's previous academic coursework and extracurricular activities as highlighted below (in the remainder of Part II of this application):

Computer Science

1.1. First Research Sub-Field

Please specify a sub-field within the field chosen above — for example, immunology, genetics, bacteriology, proteomics, organic synthesis, atomic physics, cosmology, graph theory, machine learning, nanomaterials, quantum computing, photonics, physical oceanography, structural mechanics, etc.

Intelligent Signal Processing

2. Second Research Field:

Choose from one of the following, or write in your own field. This research field should be distinct from the research field chosen above:

Robotics/Mechatronics

2.1. Second Research Sub-Field

Please specify a sub-field within the second research field chosen above. This sub-field should of course be distinct from the first choice above:

Autonomous Motion Planning

IIb. Applicant Personal Statements   ***** indicates a required field

To each question below, please provide a response with specific details that give evidence of performance, passion, and promise in the sciences or mathematics. Should an applicant be accepted, CEE does not promise specific research projects, but the information provided here will offer valuable insight into how a student thinks about science or mathematics and what sorts of problems he or she might enjoy. Please DO NOT request specific mentorships or projects in your statement.

1. Why did you choose these research fields?

Articulate why the research fields chosen on the previous page are intriguing and exciting to you. For each sub-field, state what you perceive as the one or two most interesting questions or problems in this area. Explain why these sorts of questions interest you. Your responses are shared with mentors. Please respond with clarity and specificity, including what specific prior research/coursework/etc experiences have prepared you to "hit the ground running" in these fields at RSI.

It was during a COVID-19 YouTube binge that I was first introduced to the art of modern computing. After stumbling into a rabbit hole of videos explaining the inner workings of machines, I immediately fell in love with Computer Science. Over the years, I have also developed a specialized interest in signal processing and its applications. My curiosity in this topic stems from my first Math Club meeting in ninth grade, where a senior officer explained the fascinating science of how radio signals are transmitted and received using Fourier transforms. These concepts overlapped with my learning of Calculus, and I was amazed at how signals can be analyzed and processed.

Today, the major question that excites me within the field of signal processing is how to effectively adapt digital signal processing and machine learning for real-time, resource-constrained embedded systems. As a robotics enthusiast, I have always been interested not just in the theoretical software but also in the practical hardware embedding of these algorithms. This sparked my interest in signal processing for embedded systems, prompting me to start a two-year research project that would become the focus of my life.

My first real dive into signal processing came with GaitGuardian, a project aimed at predicting Freezing of Gait (FoG) episodes in Parkinson's patients. I looked at the raw data collected in the dataset: pure noise. Converting this noisy data into a tangible output became my obsession for the next year. I experimented with Fourier transforms, z-score normalization, and wavelet denoising, testing and retesting until the subtle rhythms of movement started to emerge. Feeding the cleaned data into a 1D CNN, I watched as the network began to pick out features I hadn't even noticed. Adding a BiLSTM with attention mechanisms let the model understand sequences in both directions, and finally, I could see real-time predictions of FoG episodes coming to life. The thrill of turning messy signals into actionable insights hooked me completely.

Once I had a handle on FoG, I couldn't stop thinking about other Parkinsonian symptoms. Tremors, the involuntary shaking of

hands, became my next challenge. I experimented with filters and frequency analysis, trying different ways to separate the tremor from normal movement. When the CNN I trained finally hit 99% accuracy without flooding false positives, it wasn't just a technical success—it was a glimpse of how signal processing could make a real difference in people's lives. Even in my robotics team, I began seeing these patterns everywhere: IMU data could make our robots more precise, Kalman filters could reduce drift, and every signal I processed taught me a little more about how to read the hidden stories in data.

My second major interest is robotics, which began when I was lucky enough to join my middle school's robotics team in sixth grade. Because of COVID-19, our team had to build everything from scratch, and as a completely inexperienced seventh grader, it took me seven months just to figure out how to spin a motor. The same fascination I felt with computers now extended to physical hardware, and I became fully immersed in the First Tech Challenge (FTC) robotics competition. As my team's lead programmer, I dove into the algorithms that drive robots during the 30-second autonomous period, learning how software can bring complex machines to life.

Today, I am intrigued by two major research questions in autonomous motion planning. First, I wonder how multiple autonomous agents can effectively coordinate in real time to achieve a common goal while avoiding collisions. This fascinates me because it combines path planning, communication protocols, and decision-making under uncertainty. Second, I am interested in whether autonomous robots and vehicles can learn optimal paths from experience rather than relying on pre-programmed maps. Reinforcement learning for motion planning excites me because it allows devices to improve performance over time in dynamic environments.

My hands-on experience with robotics has shaped how I approach complex problems. In FTC, I developed algorithms that allowed our robot to navigate precisely and reliably during autonomous periods, earning a top-30 global ranking. Beyond competitions, I experimented with coordinating multiple robots in a shared space, building a system that let them move efficiently without collisions. These projects taught me how to balance planning, adaptability, and real-time decision-making—skills I am eager to apply to broader questions in autonomous robotics.

Together, my experience in robotics software, signal processing, and machine learning has prepared me to hit the ground running at RSI, and I am excited to further explore these research questions with the guidance of expert mentors and resources.

2. What are your long-range goals?

Every word amazed me. ChatGPT did not feel like yet another website so much as a magical portal to infinite knowledge. I still remember the thrill when my computer science teacher unveiled the mystical tool that could ace our rock-paper-scissors coding exam in under a minute. Little did I realize that in less than three years, AI would touch everything I do—from school projects to software debugging, even revising this very essay. But it was in the summer of 2023 that my best friend asked me a life-changing question: "How does it work?" I was completely clueless, and I told him that a stenographer was typing at the other end. As months passed and my AI usage exponentially increased, this question haunted me. I was determined not to be a mere user, but to understand and develop the magic behind the curtains.

That summer marked the start of my first long-term goal: truly understanding the devices and programs I use. I began with my robotics team, Technical Turbulence, as the sole software member, learning everything from scratch. I started by tracing wires, realizing that hardware mastery was key to understanding software. Layer by layer, from PWM control to I2C communication, I built up to writing the software itself. In ninth grade, I explored thermoelectric generators, then shifted to signal processing and machine learning the following year. These experiences taught me that real mastery comes from digging beneath the surface. Today, I pursue this goal through passion projects—most recently, hosting a full server on an old Chromebook. While the result mirrors a Replit fork, the knowledge I gained in Linux, networking, and cybersecurity was invaluable. With this mindset, I approach RSI, eager to learn from experts and deepen my understanding of computer science.

My Parkinson's research was also started for this very purpose: to learn and understand the complex fields of signal processing and machine learning with a senior friend of mine. However, it quickly evolved into a mission to use my limited knowledge to make a real-world impact. During our presentation at the Dallas Science and Engineering Fair, a judge approached us after our presentation and shared that his father suffered from Parkinson's disease. I didn't think much of it at the time, but when we emailed the Dallas Area Parkinson's Society (DAPS) to share our findings, the overwhelming response from patients and caregivers made me realize the true potential of our work. Two months later, a close family friend was diagnosed with early-onset Parkinson's, and I realized the hope that research brings to people. Therein lies my second long-term goal: use my knowledge to improve the human condition through impactful research.

Although my skill set is still limited, my goal is to continue to push the boundaries of technological applications to eventually benefit humanity. Not only am I interested in healthcare applications like GaitGuardian, but I am also fascinated by the potential of robotics and software to improve everyday life. For example, I was particularly piqued by the recent advancements in autonomous pathing of multiple agents, as I see huge potential for applications in warehouse automation, construction, and even self-driving cars. Be it through hardware, software, or a combination of both, I am committed to expanding my knowledge and using it to make a positive impact on the world. RSI represents a crucial step in this journey, allowing me to work on relevant research that pushes the boundaries of technology. As a devout Hindu, the Vibuthi (cow ash)

I apply to my forehead reminds me that all humans will eventually unite with the Earth, and I want to be remembered for leaving a positive mark on humanity before I do.

My final long-term goal is to encourage and inspire the next generation of students to pursue STEM. As someone who has experienced the transformative power of a good teacher firsthand, I am passionate about helping others discover the joy of learning. After realizing that a teacher can change my perception of a subject itself, I committed myself to tutoring and helping others. Whether it is through robotics outreach or through my school's ACE tutoring club, I have always sought to share my knowledge and enthusiasm for STEM with others. I hope RSI presents me with an opportunity to further this goal by providing me with world-class mentorship and resources, which I can then use to benefit others in the same way RSI will benefit me.

3. What activities and/or hobbies demonstrate your leadership, creativity and uniqueness?

Music was my first language. Even before I could speak, music became the place where I learned to create. Throughout elementary school, I learned piano and Classical Indian Carnatic vocals, but even after I picked up flute for my middle school band, I never felt I was truly expressing myself. It was finally in eighth grade, when I decided to drop my perpetual practicing and pursue a form of music that reflected me: Indian film music covers. Unlike Western music, which centers on albums, popular music in the Indian subcontinent is woven into cinema, with most movies featuring five to six full-length songs. I wanted to not just replicate these songs, but to enhance them, leaving my own fingerprint on familiar melodies.

Here, my creativity finally blossomed in the form of tasteful covers that completely reimagined familiar melodies. After learning about the world of Digital Audio Workstations (DAWs), I realized that most musical instruments can be reproduced with a digital keyboard language known as MIDI. This completely changed my life—propelling me into a universe that lies at the intersection of my two greatest passions: music and technology. I spent countless hours tinkering with plugins and virtual soundtracks to digitally capture the subtle beauty of each sound. I even bought a $50 Black Friday bass guitar and began merging analog and digital sounds. My music started to feel like me.

Joining my first band, High Octavez, was transformative. As a group of hobbyist musicians dedicated to faithfully recreating iconic film music, High Octavez taught me what it means to collaborate at a high level. Together, we recreated iconic film music with precision, and all proceeds went to charity. As the keyboard player, I didn't just perform; I sculpted the sounds, blending technical skill with creative vision. Performing in two concerts, which collectively raised over $300,000 for charity, showed me how creativity can make a tangible impact. Not only was I expressing myself, I was also helping my community. Now, as I prepare for my third concert, I am continuing to fuse music and technology. Using my server-side knowledge to develop a music streaming service, I am able to express my creativity in a positive manner by combining my talents and passions.

As much as I had collaborated in High Octavez, I would collaborate more in my studies. From the moment I entered high school, my friends and I formed a joint study circle where we would discuss upcoming assignments and tests. Before we learned the biological concept of mutualism, we were practicing it through 10 PM Discord calls. Midway through ninth grade, I added another friend to our group chat…then two. Within a matter of 30 minutes, we had invited over 30 people to join our newly made study server for the Plano East Class of 2027. Before long, rules had to be set, and I made the unfortunate mistake of banning swearing.

For obvious reasons, this did not sit well with my peers, and moderation quickly became a nightmare. From rogue non-Plano East students invading the server to a perpetual spew of racial slurs, we were quickly overwhelmed. Every loophole was penetrated; every vulnerability was exploited. At that exact moment, I began using my coding skills to our advantage, developing Discord bots to manage moderation. I began outsourcing work to other moderators and study guides, leading a group of nearly 200 members to create a haven for studious students. Before long, all members required school ID-based verification, and I had integrated AI into moderation to prevent penetration. At the end of my tenth grade, nearly 60% of my class had joined the server. By hosting study sessions and posting valuable studying resources, my server had gained the trust of not just students but teachers alike. In fact, our human geography teacher hosted a last-minute AP exam study session through the server.

Through both music and academics, I've realized that creativity, collaboration, and technology can come together to make something bigger than I could ever do alone. Whether it's shaping sound into a piece that truly feels like me or building a space where students can learn and grow, these experiences have shown me how powerful it is to combine passion with purpose. I've learned that real impact—whether in art, learning, or tech—comes from curiosity, dedication, and the courage to step up and create something meaningful.

4. Describe your participation in extracurricular or community outreach activities?

My heart was pounding relentlessly; every second felt like an eternity. It was my first robotics competition, and my code would determine our team's advancement. As the delay continued, my mind raced through all the possible errors. Finally, the announcer began his countdown, and all I could think of was the robot crashing into the wall, ending our competition. The buzzer sounded, I pressed play—nothing. The robot simply stayed in place. Watching the program fail over the next thirty seconds, I felt pure embarrassment. Losing in the final round, I promised myself my code would never perform so poorly again.

And so began my deep dive into the First Tech Challenge (FTC). Entering high school, I switched from my middle school team to a small community team consisting of friends from Schimelpfenig Robotics. At this point, I was an experienced programmer in name only—my actual skills were minimal. I knew no programming languages, couldn't grasp high-level concepts, and had learned only a fraction of the math needed for autonomous navigation. I was thrown into the deep end, and our team had to stay afloat.

I learned. I mastered the basics of Java and joined the school's CS Club to strengthen my skills. Before long, I could make our robot move and score points using only code. As the team's sole programmer, I gradually learned to integrate sensors, motors, and servos. Progress came, and our team became state finalists. By sophomore year, I had become a competent programmer, and our team expanded to include other programmers. That summer, I took on the challenge of coding an autonomous pathing system, and after four months of constant iteration, my code could move a robot from point to point accurately. Leading the software unit, I helped expand our autonomous and driver-operated capabilities to a world-class level, ranking in the top 30 globally in autonomous. Now, as I continue to spend countless hours on robotics, I use my knowledge to push our team further. Having learned multivariable calculus and qualified for the AIME, I could finally apply my math skills to my passion for robotics. I hope our team can break our final barrier and win the world championship this year.

Everything in my life had reflected the stereotypical nerd: poor posture, obsession with CS, and more screen time on my calculator than anything else. Three months ago, I finally broke that mold by founding my school's cricket club. After a wrist fracture had halted my competitive career, I was determined to find a way back to the sport I loved. When I realized that a school with nearly 600 Desi students had no cricket team, I started the Plano East Cricket Club with a few friends. Unlike the competitive teams I had played on, this club uses a softer taped-tennis ball, reducing equipment needs and costs. Initially, the club aimed to rally experienced cricket players, but a lack of attendance opened it to complete beginners. Teaching while playing was challenging, and I learned new coaching methods to keep practices engaging. Though our team often loses, building it from scratch gives me a sense of closure and pride in continuing the sport I once left.

In addition to helping my school community learn cricket, I have sought to make a broader impact through my school's National Honor Society (NHS). After a competitive application, I was selected as the technology officer for the largest chapter in the world. In this role, I have worked to modernize our chapter's operations through technology. By developing and maintaining a custom hours-logging portal, I have streamlined the process of tracking service hours for over 1,300 members. By combining my coding skills with a passion for service, I have been able to make a tangible impact on my community. As we continue developing QR-code check-ins and AI-powered event recommendations, I am excited to further enhance our NHS operations through technology.

5. How did you hear about RSI?

Check all that apply. This will not impact your selection decision, we just want to know how people are learning about RSI to know if our outreach is working.

Email from CEE|Email from MIT|A teacher or research mentor|RSI alumnus

5.1. Name(s) of teacher(s) or mentor(s)

Mrs. Julie Baker,
Mrs. Amanda Miller,
Dr. Ashley Carter

6. Why are you applying to RSI? What aspects most appeal to you?

Please tell us in more detail about how you learned about RSI and why you chose to apply. What makes this the way you want to spend your summer?

On May 24, 2025, I officially had nothing to do. The last day of school had just ended, and the summer break I had eagerly awaited for months had finally arrived. However, as I sat in my room contemplating my plans for the next three months, I realized that I had none. I had an endless expanse of free time, but most of it was eventually wasted on half-baked projects and mindless YouTube binges. In searching for ways to fill my summer, I stumbled across RSI. First from my science teacher, then my research sponsor, and finally from my own Google feed, RSI was everywhere I looked. The more I learned, the more I realized that RSI was the perfect fit for me.

For the past year and a half, my passion has been in signal processing, machine learning, and autonomous robotics. My research on Parkinson's disease and my work on the robotics team have opened my eyes to the potential of these fields, and RSI offers the chance to connect with world-class mentors who can help me push the boundaries of my knowledge. For example, Professor Lizhong Zheng's recent publication on "Configuring RNN Weights" closely aligns with my research on signal processing for Parkinson's disease. Dr. Zheng's signal processing–based approach to configuring RNN weights mirrors my own work on making biLSTM attention blocks biologically relevant.

By joining RSI, I am eager to learn from Dr. Zheng and other domain experts who share my passion for signal processing and machine learning. When I saw that RSI offered the opportunity to advance my research with such mentors, I knew I had to apply. Robotics, AI, and signal processing are the thoughts that keep me awake at night—RSI is where I can finally pursue them.

IIc. Course Work

* indicates a required field

In the reference section, the applicant will indicate a school counselor or official who will submit school transcripts on the applicants' behalf. On this page, the applicant should specify any additional mathematics, science, computer programming or engineering coursework that have been completed, or will be completed as of June 2026, beyond what is covered in the transcripts. Expected or actual dates of completion may be approximated (within a window of a few weeks):

1. STEM coursework experience

While RSI does not have a formal pre-requisite curriculum for *any* research area, the selection committee would like to know if you have any experience in the following core areas of math and science. Please check the box next to the field if you will have completed any high school (or higher) coursework in these areas by the end of your junior year. Again, every student may not have the chance to take all of these courses by the end of 11th grade.

Calculus|Physics|Biology|Chemistry|Computer science

2. Computer Skills

Please report your familiarity with: commonly-used operating systems; programming, scripting, or markup languages; or analysis packages or environments.

While CEE does not require fluency with any particular programming language, it is strongly recommended that applicants have some experience with a tool or framework that facilitates the ability to model systems, perform symbolic or numerical mathematics, and/or analyze data. Python, MATLAB, Mathematica, R, Java, or C/C++ are common choices.

For each language, framework, or program, please indicate your level of experience as either Beginner, Intermediate, or Advanced. Beginner experience implies some exposure or occasional past use; Intermediate experience implies moderate exposure or frequent use; Advanced experience suggests development expertise or extensive use in one or more significant projects.

Language/package/etc	Level of experience
Java	Advanced
Python	Advanced
NumPy / SciPy / Pandas	Advanced
TensorFlow	Intermediate
OpenCV	Intermediate
C++	Beginner
Bash	Beginner

2.1. Further experience, if any

Briefly describe any past or ongoing experience with computer programing, modeling and/or data analysis you indicated an Intermediate or Advanced level of familiarity with in questions 2 and 3, addressing both questions posed and methods and tools employed.

Java: I have experience in robotics (FTC) and competitive programming. In robotics, I design control systems, autonomous routines, and libraries, including a motion-profiling and trajectory-planning library using PIDF loops and kinematic models. I also implemented real-time projectile calculations for shooting balls from a moving robot. Outside robotics, I practice competitive programming and am familiar with data structures (trees, graphs, heaps) and algorithms (A*, dynamic programming).

Python: I use Python for data analysis and machine learning. For Parkinson's research, I applied Fourier transforms and wavelet denoising on IMU data using Numpy, SciPy, and Pandas, visualizing patterns with Matplotlib and Seaborn. I built a 1D CNN and biLSTM in TensorFlow with custom layers and attention for real-time detection of Freezing of Gait.

Vision Processing: I used TensorFlow and OpenCV for computer vision in robotics, creating pipelines for object detection and deploying lightweight models with TensorFlow Lite.

Other: I have experience in C++ for ESP32 firmware and Bash for Ubuntu server automation, including backups, updates, and web project deployment. I also wrote a shell script to render my resume in the terminal.

3. Additional STEM Courses

Please indicate any courses, not covered in your transcripts, that were taken in math, science, computer programming and/or engineering. This could include, but is not limited to, courses taken at a local community college or university, during the summer, and/or online. Please indicate course subject, where the course was taken and the date the course was (or will be) completed. (E.g. Physiology - University of Virginia - June 2025)

Course Subject	School/Program	Completion Date
Calculus 3	Collin Community College	December 2025

4. Please provide any other information regarding your academic performance or context which might be relevant

Please let us know if there are any notable opportunities or barriers that have meaningfully enhanced or constrained your ability to take classes, undertake research, or otherwise pursue your intellectual interests and aptitudes. For example, you might explain any opportunities for advanced study that your school offers that you have taken advantage of, or conversely, that your school lacked. This question is optional.

IId. Standardized Test Scores   * indicates a required field

Though no particular standardized tests are preferred, at minimum the PSAT is strongly recommended. The applicant should self-report his or her best-standardized test scores here. Be sure to include the date of administration for each exam listed. Copies of official score reports for all tests administered by the College Board, APs, ETS or ACT, Inc, etc should also be uploaded as a PDF (one document max) at the bottom of the page.

1. PSAT Scores

Please indicate the date of your exam, your overall score, evidence-based reading and writing score and your math score below

Overall Score	Reading and Writing	Math	Exam Date (mm/yyyy)
1460	700	760	10/2025

2. SAT Scores

Please indicate the date of your exam, your overall score, your evidence-based reading and writing score and your math score below. If you took the Essay Portion, please indicate that score as well. If you took an earlier version of the exam, indicate your exam dates and scores in the comment section at the bottom of the page.

Overall Score	Reading and Writing	Math	Essay	Exam Date (mm/yyyy)
1550	760	790		09/2025

3. ACT Scores

Please indicate the score you received in each section in the table below. In the follow up question, please indicate the exam date and composite score.

4. AP Exams

Please enter details for any AP exams you have taken in the table below. In the first column list the test subject, your score in the second column and the test date (mm/yyyy) in column three.

Test Subject	Test Score	Test Date (mm/yyyy)
Human Geography	5	05/2024
Computer Science Principles	5	05/2024
World History: Modern	5	05/2025
Precalculus	5	05/2025
Calculus BC	5	05/2025
Environmental Science	5	05/2025
European History	5	05/2025
Music Theory	5	05/2025

5. TOEFL Scores (International Students Only)

Please indicate your overall score and the score you received in each section in the table below. In the follow up question please, indicate your exam date.

6. Other National or International Exams/Tests:

Please enter details on any other standardized exams or test taken below. These could include other international curricula (like the IB, IGCSE, CAPES, IELTS, DuoLingo, etc), or some international exams. In the first column list the exam/test name, your score in the second column and the exam/test date (mm/yyyy) in column three.

7. Score Upload

Please attach a PDF of your test score report (this should be the official copy you received from the testing service that administered the test) you self-reported above. Include all test scores you intend to share in one PDF file.

ScoreReport.pdf

IIe. Applicant Awards and Accomplishments

The applicant should concisely list awards, achievements, activities, and accomplishments in academics, research, and extracurricular activities. Please include approximate dates, but prioritize by importance rather than sorted chronologically, so that any national or international awards are showcased.

Do not send CEE a supplemental resume or curriculum vitae. Further details of activities of particular significance to the applicant may be explored in the Personal Statements:

1. Science Fairs, Competitions, or Programs

If you have done so, please indicate science fairs and competitions to which you may have submitted work or otherwise participated in. Please note CEE neither presumes nor requires that you have presented work at a science fair or competition; this is just a form to gather data in a structured way.

Local/Municipal Science/Engineering Fair Finalist|State/Regional Science/Engineering Fair Finalist|International Science and Engineering Fair (ISEF) Finalist|Junior Science and Humanities Symposium (JSHS)

1.1. Additional ISEF information

Please provide the year(s), project ID(s), category/categories, title(s) of your ISEF finalist project(s). If you're not sure, you can find this information in https://abstracts.societyforscience.org/.

ISEF Year	Booth/Project ID#	Category	Title	Team or individual?
2025	ROBO011T	Robotics and Intelligent Machines	GaitGuardian: Real-Time IMU Processing and Visual Monitoring Using Machine Learning (ML) for Advanced Parkinson's Disease Patients (II)	Team
2024	ETSD012	Engineering Technology: Statics & Dynamics	Simply Stir: A Novel Approach of Harvesting Low-Grade Thermal Energy Using the Seebeck Effect to Power an Automatic Stirrer	Induvidual

1.2. Please list any special or grand awards won at ISEF, or any other recognition there.

2. STEM Olympiad Distinctions

Please indicate your participation in any of the following math and science olympiads (not including SciOly). Please note that, as above, CEE neither presumes nor requires previous scientific olympiad experience to attend RSI.

AMC/AIME/USAMO

2.1. MAA Exams

Test Name	Test Score	Date
AMC 10A	108	11/2023
AMC 10A	97	11/2024
AMC 12A	99	11/2025

2.2. Highest level of achievement

Took the AIME

3.

Please list (concisely) other major awards, activities, and accomplishments in science, technology, engineering, or mathematics:

Give some measure of the extent of participation and accomplishments, and awards or recognition received, in STEM-related areas, including for example: olympiads, academic bowls, math competitions, science fairs, talent searches, robotics competitions, hackathons, academic or scholarship competitions or prizes, STEM clubs, research internships, science or math camps, scientific publications or conferences, not otherwise addressed above.

Awards:

2023 MMaths Top 10 Competitors in Dallas

2024 Dallas Regional Science Fair: 1st in Engineering Technology, US Air Force Certificate of Achievement, US Metric Association Best SI Units, Top 9 in Fair

2025 Dallas Regional Science Fair: Physical Science Grand Prize Runner-Up, 1st in Systems Software, TI Best Computational Project

2024 Robotics: State Division Finalist, North Texas Innovate Award Winner

2025 Robotics: North Texas Division Winning Alliance Captain, 2nd Place Design award

Activities:

Robotics — Technical Turbulence FTC
Independent Research (via Science Fair)
Competition Math
NHS Technology Officer — developing and maintaining hours-tracking portal for 1300+ members

4. Please list (concisely) the applicant's most important non-STEM awards, activities, and accomplishments:

Give some measure of the extent of participation and accomplishments, and awards or recognition received, in other areas, including for example: performing, visual, or literary arts; athletics; outside hobbies; clubs; journalism or blogging; student government or leadership; education, public service, philanthropy; or entrepreneurship.

Awards:

Presidential Awards for Service: Silver, for High Octavez charity concert (2023)
Indie Film Music Scoring Semifinalist (2025)

Debate Texas State Quarterfinalist in Impromptu (2025)
National Speech and Debate Tournament (2025) Quarterfinalist in Impromptu, Octofinalist in Extemporaneous Commentary

Selected for the USA Cricket Dallas Under-15 Team

Activities:

Indian Film Music Arrangement
Bass Guitar Player
Keyboard Player for non-profit band High Octavez — over $300,000 raised for Karuna charity — compassion towards humanity
NHS Service and Volunteering
Speech and Debate

5. Please list any previous STEM research

CEE neither presumes nor requires previous scientific research projects to attend RSI, but if the applicant has undertaken research, the RSI selection committee will be interested in hearing about your most significant previous experience, whether undertaken in an academic, corporate, non-profit or governmental setting.

This might include: projects for science fairs or other STEM competitions, or paid or volunteer research at a university, business, medical center, or a state or national laboratory, or else a substantial and substantially self-directed experiment or project for a research course or program offered at your secondary school. "Shadowing" type internships would not normally be construed as independent or supervised STEM research, nor would independent self study or supervised reading courses, nor standard laboratory assignments in conventional science courses.

Have you conducted any prior STEM research? If so, more follow-up questions will be asked.

Yes

5.1. Previous Research Topic:

Briefly describe the topic and structure of your most significant or most recent research project. Summarize your contributions to the project, and indicate what specific tasks you undertook.

My most recent research focused on creating a low-cost, multimodal machine learning framework to diagnose and monitor Parkinson's Disease (PD), targeting critical motor symptoms such as Freezing of Gait (FoG), tremors, and fall risk. The project integrated sensor, behavioral, and vocal data to develop real-time, accurate, and globally accessible tools for PD assessment. I collaborated closely with a friend, and we initially split the workload equally, coordinating entirely remotely through a shared Git repository. We held biweekly meetings to plan, brainstorm, and debug, ensuring that the project progressed smoothly despite the challenges of remote collaboration.

The project was organized around five key tasks: predicting Freezing of Gait (FoG), detecting falls, identifying tremors, and estimating Parkinson's Disease severity using typing and voice data. Each task focused on a specific symptom and contributed to a comprehensive system for monitoring and assessing PD. Together, these tasks allowed the framework to provide real-time insights into motor function and overall disease severity, creating a tool that could improve diagnosis, guide treatment, and enhance quality of life for patients worldwide. Our results outperformed state-of-the-art models while working in real time. Our models also patched existing limitations by reducing subject dependence, properly sampling data, and training for biological relevance.

Within the project, I handled all of the pre-inference aspects. This included dataset relabelling, denoising, and signal processing. In signal processing, I tested (by trial and error) various filters and features to optimize model performance, and I ensured that all data would be standardized and normalized to attenuate sensor and placement dependency. Within the three classification models, I fully constructed the 1D convolutional neural network for tremor detection, and I entirely completed the UPDRS regressor for keystroke data.

I also optimized models for computational efficiency, enabling real-time deployment on affordable hardware. In doing so, I designed and fabricated a custom PCB with an ESP32 module and an I2C MPU-6050 IMU. After hand-soldering the connections, I encased the electronics in a custom 3D print for proper durability. Overall, the project was a success, and I am continuing my research into the 2026 calendar year. By improving my knowledge of signal processing and model construction with world-class mentorship and guidance, I hope to elevate my research to the next level.

5.2. How was your prior research structured?

Research is a collaborative process. Please help us learn more about your research experience by checking all that apply.

Identified and contacted a scientist on my own, without support from a relative, my school, or acquaintances|Read science journals, books, and/or magazines, and performed the research fully on my own

5.3. Which of the following describes your research experience?

Select all that apply. (We are fine with any of the options below—we just want full disclosure.)

My research experience did not involve fees or payments.

5.4. Where and when did you conduct your research?

Describe the research location (university, institution, company, etc.) including the name of the lab, department and/or program, if applicable. Also hours per week and dates worked (e.g., 7 hours/week from June 1–August 15, 2025).

Home Research: September 2024 — Present (December 2025), 2-8 hours/week

5.5. Research mentorship

If you had a mentor as indicated above, please indicate how you first met them, and what role they played in your research (what were their responsibilities? How did they guide your work? How often did you meet? etc)

I had two mentors in my research. Firstly, my engineering teacher, Mr. Scott McCleneghan, guided me in all of my electrical aspects. We only talked twice (for roughly one hour), but he had helped me with fabricating my own PCB and wiring up the electronics in a professional manner. My second mentor was my robotics coach, Mr. Matthew Kruger. Mr. Kruger helped with the physical soldering of the wires and connections, and he also gave me guidance on the I2C bus management on the C++ firmware. Overall, their contributions were very helpful, although the research and ideation were not impacted by their help.

6. Hands-on project portfolio

If you work on hands-on projects that demonstrate technical creativity and aptitude, please link us to an external, well-organized, publicly available portfolio of your projects for us to review (e.g. a website, YouTube video, Google Drive folder, etc). This section is optional, and not expected; we are simply making it available as a space for you to share such projects with us, if you do them.

7. Publications:

CEE neither requires nor expects RSI applicants to have scientific publications, but the selection committee would like to learn more about any articles or papers that have either: been published or accepted for publication in a peer-reviewed journal or conference; been posted as a preprint; or been submitted previously to an official national or international science fair, talent search, or other competition.

Please submit a link to the article or the abstract below.

IIIa. Applicant Releases and Affirmations   * indicates a required field

Please read each statement carefully, and indicate understanding, affirmation, or agreement as indicated. Acceptance of these conditions is necessary for consideration for admission to the 2026 RSI:

1.
Information provided as part of this application may be reviewed by CEE staff, and will be shared with the RSI selection committee. If a student is selected to attend RSI, the completed application may also be shared with RSI academic staff, prospective research mentors or other publicity.

I understand.

2. All Personal Statements (in Part II) were written by me.
(Some editorial advice from teachers, mentors, supervisors, coaches, counselors, peers, or parents or other family members is expected and acceptable).

I affirm.

3.
I hereby waive any rights to examine, read, review, reproduce, or re-transmit any recommendations provided in support of this RSI application.

I agree.

4.
I intend to complete my final academic year of secondary school starting in the spring/summer of 2027, and to enter college or university in the summer or fall of 2027 (but not sooner).
(Please either affirm or explain how and why your academic trajectory differs):

I affirm.

5.
RSI is a voluntary educational enrichment program, which provides room, board, and local transportation to admitted students but does not offer any salaries, stipends, or course credit.

I understand.

6.

RSI is an intensive residential program, where all students are expected to remain in residence at MIT during the entire extent of the program (June 28 to August 8 2026), and to devote their full effort and energies to RSI activities.

I understand.

7.

If an applicant is offered admission to RSI 2026, CEE and/or MIT will require from the applicant and/or the applicant's guardian further proof of insurance (for US students), waivers regarding liability, permission for use of photographs or other publicity, etc.

I understand.

8.

The RSI application is considered copyrighted material by the Center for Excellence in Education. Apart from personal use and online submission via slideroom.com, any electronic or physical reproduction, transmission, or distribution of any part of this application without the explicit consent of CEE is not allowed.

I acknowledge.

9. To the best of my knowledge, all information provided in this application is true and accurate.

I affirm.

10.

Please type your full name in the box below, to indicate that you have read, understood, and agreed to the conditions of application outlined above.

...Thank you for applying to RSI. We appreciate your interest, and look forward to reading your application....

Keshav Gopalan Anand

11. Date of submission.

(in mm/dd/yyyy format):

12/10/2025

IIIb. Guardian Releases and Affirmations   * indicates a required field

The following section must be completed by a parent or legal guardian of the applicant listed in part I.

1. At the time of application, the age of the applicant is:

16

1.1.

If my child/dependent is selected for RSI, I will encourage him or her to participate in RSI/CEE activities through undergraduate and graduate years of study.

I agree.

1.2.

I understand that CEE is a nonprofit, and if my child attends RSI, I will consider supporting the program through my time and/or donations of funds.

I agree.

1.3.

I have read and understood all above affirmations/declarations made by my child/dependent, and endorse all of these declarations:

I affirm.

1.4. To the best of my knowledge, all information provided in this application is true and accurate:

I affirm.

1.5.

By typing my full name in the box below, I indicate that I have read, understood and affirmed the statements above.

...Thank you for your interest in the RSI program, and for your support of your child's STEM passions and educational aspirations....

Anand Gopalan

1.6. Today's Date

(in mm/dd/yyyy format):

12/10/2025

2. Please indicate the mode of payment of the suggested RSI application fee:

To help defray costs, CEE requires a (US) $75.00 application fee and a $35 (International) fee with each completed application. (This fee may be waived upon request in a timely manner. Please contact maite@cee.org to request a waiver).

Secure credit/debit card payment via www.slideroom.com

2.1.

Please check the box below to acknowledge that you have selected to pay the qpplication fee through Slideroom.

This payment must be completed online using a credit or debit card, before Slideroom.com will allow final submission of the application.

Acknowledged.

Anand, Keshav   52018302884

REFERENCES

Scott McCleneghan

Mr.

Plano East Senior High School

scott.mccleneghan@pisd.edu

Engineering Teacher

Request emailed on November 21, 2025

Waived right to review

Amanda Miller

Ms.

Plano East Senior High School

amanda.miller@pisd.edu

School Research Sponsor

Request emailed on November 21, 2025

Waived right to review

Matthew Kruger

Mr.

Technical Turbulence FTC

matthewrkruger@gmail.com

Robotics Coach

Request emailed on December 2, 2025

Waived right to review

Geneva Hauglie

Asst. Registrar

Plano East Senior High

geneva.hauglie@pisd.edu

469-752-9023

Student

Completed on December 10, 2025

Waived right to review

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