

## GAUTAM KRISHNAN

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### RESUME

#### EDUCATION

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- University of Texas at Austin** Aug 2022 - Present
- Majors – Physics, Math, and Astronomy
  - Accepted into the **Polymathic Scholar Honors Program** in CNS
  - GPA (As of January 2024) 3.85
- The School, KFI, Thalambur, Chennai, India**
- *Indian School Certificate (ISC): Grade 12* July 2022
  - *Indian Certificate of Secondary Education (ICSE): Grade 10* 2020

#### RESEARCH & EXPERIMENTS

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##### MATH

- Program to Solve a First Order Differential Equation using Picard's Iteration** Jan 2023 – Present
- 2 Programs:
- In **Java**
    - Coded in the absence of Calculus and Algebra libraries
    - Wrote basic functions for math operations. E.g., integration and evaluating a math function
    - Project ongoing (removing bugs, and making the program more general and robust)
  - In **Python**
    - Used Python's SymPy library for computer algebra and symbolic arithmetic
    - Simple and efficient program

##### HUMANITIES INQUIRY

- "Addressing the Discrimination of the Differently Able"** Aug 2022 – Dec 2022
- Part of introduction to humanities research in Undergraduate Studies (UGS 303)
  - Semester-long assignment
  - "Archived object" chosen and connected to contemporary issue
  - Object - Etched 17th century print by Jusepe de Ribera, *"The Large Grotesque Head (Man with Goiter)"*
  - Issue – Discrimination based on disability

##### PHYSICS

- Flute Physics** 2020 – 2021
- The *Air Column Length Hypothesis* was validated, and the *Volume Hypothesis* was disproved.
  - Designed a Hindustani classical flute incorporating Pitch, Frequency, Wavelength, and End Correction.
  - Implemented the design in *3.3 Thermal expansion Borosilicate Glass*.
  - Made innovative modifications to the design to facilitate the playing of certain "Raags\*". E.g., the 8<sup>th</sup> hole to play raag Kedar.

\*A Raag is set of notes within a framework that is artistically interpreted to produce music.

- Electric Micro Car** 2020 – 2022
- Used the principles of Mechanics, Aerodynamic Resistance, Frictional forces, and Power & Battery capacity Estimation
  - Evaluated the working of various types of motors and incorporated the Brushless Direct Current (BLDC) motor to power the car
  - Programmed motor controller for regenerative braking and cruise control
  - The car features an unconventional Tadpole configuration, where two wheels are in the front, while one is in the rear

#### OXYGEN CONCENTRATOR RESEARCH & IMPLEMENTATION

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##### VERTIS LABS

*Manufacturer of 3.3 thermal expansion borosilicate glass kitchenware in India. The Company extensively uses industrial oxygen to blow and shape glass.*

- Evaluation** 2021
- To address the government directive to stop supplies of industrial oxygen due to the severe shortage of medical oxygen during the second wave of the COVID-19 pandemic in India, an oxygen concentrator was conceptualized and put together.
- After understanding various methods to generate Oxygen, the Pressure Swing Adsorption (PSA) technique was shortlisted.
  - The PSA concentrator prototype was implemented in association with Vertis Labs.

- Kundrathur Village** 2021

- To coordinate and provide the oxygen concentrator on request to the people of Kundrathur village in times of oxygen shortages during the COVID-19 pandemic.

## INDIAN (HINDUSTANI) CLASSICAL FLUTE

2017 – Present

- Made weekend trips from Chennai to Bengaluru, to learn the Hindustani style of Music
- Learned the art of blowing and fingering
- Continued learning online during the pandemic
- Working knowledge of 22 Raags

## CREATIVE PURSUITS

### Glassware Photography

2012 – Present

- Due to the financial constraints Vertis Labs had in hiring professional photographers, I took up the responsibility of Glassware photo-shoots.
- Used innovative lighting, background, and camera techniques to capture the luster of glassware and prevent shadows
- 100 products were shot, and their images were processed.

### Website Design

2021

- In continuation with the photo-shoot project, with an aim to expand Vertis Labs' online presence
- WordPress, WooCommerce, Elementor, and RazorPay were used to implement the e-commerce website
- [www.vertislabs.com](http://www.vertislabs.com)

## MONOGRAPH

2021 – 2022

- Took up the opportunity presented to me by my school to write a monograph.
- It is titled "*Understanding the Difference between Race and Ethnicity.*"
- It examines the causes, differences, and history of race and ethnicity.

## COMMUNITY OUTREACH

### Seed Planting

2019

- Planted seeds of Pongame Oiltree (Militia Pinnata) in two communities in Thalambur Village.
- It is a plant species that liberates more oxygen and whose pods can be used to make biofuel

### Reading

2019

- Read out academic and literature books and articles in English for the visually impaired at Nethrodhaya, Chennai

### Inter-community & Intra-community Sports Events

2018 – 2019

- Led the winning teams in both years of Intracommunity sports events (2018 & 2019) and the inter-community event (2018)
- I was the only member who participated in all events including Table Tennis, Badminton, Soccer, Athletics, Basketball, Volleyball, Cricket, and Water polo.

## Classes

Vector Calculus (Honors)	A
Differential Equations with Linear Algebra (Honors)	A
Linear Algebra and Matrix Theory (Honors)	A
Waves and Optics	A
Modern Physics	A-
Probability I	A
Theory of Functions of Complex Variables	A
Number Theory	A-
Classical Mechanics	
Quantum Physics I: Foundations	
Thermodynamics and Statistical Mechanics	
Galaxies and the Universe	
Real Analysis I	