

# Aniruth Ananthanarayanan

Work Email: [aniruth2207@gmail.com](mailto:aniruth2207@gmail.com) | Tel: +1 469 579-0997

GitHub: [AniruthAnanth](https://github.com/AniruthAnanth) | ORCID: [0009-0000-5220-2155](https://orcid.org/0009-0000-5220-2155)

LinkedIn: [linkedin.com/in/aniruth-ananthanarayanan](https://www.linkedin.com/in/aniruth-ananthanarayanan)

Dallas, TX

## PROFILE SUMMARY

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Aniruth Ananthanarayanan is a driven researcher and leader at the Texas Academy of Mathematics and Science (TAMS) with a strong focus on interdisciplinary innovation. His expertise spans machine learning, computational methods, and biomedical applications. As CTO of Kinetik and KidneyChain LLC, he has led AI-driven projects in organ matching and system optimization. Aniruth also serves as President of the TAMS Business Organization, fostering community engagement and professional development. His research contributions include deep learning models for metabolic profiling through Raman analysis and a standardized benchmark for kidney allocation algorithms, demonstrating a commitment to advancing healthcare through technology.

## EDUCATION

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Texas Academy of Mathematics and Science

*Aug 2024 – May 2026*

R. L. Turner High School

*Aug 2022 – May 2024*

## EXPERIENCE

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TAMS Business Organization President

*Apr 2025 – Present*

- Managed a budget of over \$21,000 to support student fees, business initiatives, and competitions, with several competitors qualifying for nationals.
- Organized outreach programs by volunteering at local schools to teach financial literacy, empowering students with valuable business and financial knowledge.
- Built a strong community presence through volunteering and providing educational resources to local schools.
- Simultaneously appointed as the University of North Texas Collegiate DECA Vice President and the University of North Texas BPA Vice President.

Chief Technology Officer, KidneyChain LLC

*Jan 2025 – Present*

- Designed and implemented an organ management system for a blockchain-based kidney-matching platform.
- Worked closely with clinicians to develop an intuitive and time-efficient user experience.
- Integrated a novel deep-learning-based kidney-matching algorithm to improve patient outcomes.

Undergraduate Research Fellow, University of North Texas

*May 2024 – Present*

- Collaborated with Dr. Guru Khalsa to apply machine learning techniques to optimize Raman analysis and facilitate metabolic profiling through Raman spectroscopy.
- Selected as one of 15 Early Summer Research scholars, receiving a \$4,000 scholarship to conduct over 300 hours of research during the summer under Dr. Guru Khalsa.
- Received \$1000 in scholarship as part of the fellowship.

TAMS Naturally Wildlife Committee Head	<i>Apr 2025 – Present</i>
TAMS “United Through HOPE” Committee Head	<i>Apr 2025 – Present</i>
TAMS South Indian Society Committee Head	<i>Apr 2025 – Present</i>
TAMS Computer Science Organization USACO Committee Head	<i>Apr 2025 – Present</i>
Texas Collegiate DECA Vice President, Collegiate DECA	<i>Feb 2025 – Present</i>
<ul style="list-style-type: none"> <li>- Conducted meaningful leadership and career development programs for over 100 collegiate DECA members.</li> <li>- Expanded DECA’s impact through outreach initiatives, sponsorships, and industry partnerships</li> </ul>	
Chief Technology Officer, Kinetik	<i>Apr 2025 – Present</i>
<ul style="list-style-type: none"> <li>- Led technical development and AI integration for automated system optimization and integration testing in GitHub repos.</li> <li>- Oversaw machine learning deployments to streamline chatbot and backend system interactions.</li> </ul>	
Machine Learning Engineer, Kinetik	<i>Oct 2024 – Feb 2025</i>
<ul style="list-style-type: none"> <li>- Developed and integrated chatbot assistants with backend systems to enhance functionality and curate user experiences.</li> <li>- Improved system efficiency and reduced operational costs by optimizing model performance.</li> </ul>	
Vice President of Technology, Student Led Chess Association	<i>Aug 2023 – Aug 2024</i>
<ul style="list-style-type: none"> <li>- Collaborated with a team of executives and more than 50 Student Led Chess Association (SLCA) leaders to design and develop software solutions</li> <li>- Created a web-based chess tournament management system, contributing to its functionality and user interface.</li> <li>- Coordinated team meetings and provided valuable insights, with the goal of building software to support SLCA’s vision of a competitive student-led chess league.</li> </ul>	
Asian Student Association Treasurer, R. L. Turner High School	<i>Dec 2024 – May 2024</i>
<ul style="list-style-type: none"> <li>- Founding officer of R.L. Turner’s Asian Student Association, establishing a platform for cultural appreciation and community engagement.</li> <li>- Managed budgeting and financial planning, securing funding to support club activities and events.</li> <li>- Organized and coordinated cultural events, fundraisers, and awareness campaigns to promote Asian heritage.</li> </ul>	
R.L. Turner Men’s Varsity Cross Country Co-captain	<i>Sep 2024 – Dec 2024</i>
Assistant Karate Instructor, Texas Isshinryu Karate Kai	<i>Apr 2023 – Nov 2024</i>
<ul style="list-style-type: none"> <li>- Assisted in conducting engaging and educational martial arts classes.</li> <li>- Demonstrated proper forms and techniques to students of various ages and skill levels.</li> </ul>	

- Fostered a positive and safe environment to build discipline and respect.

## PUBLICATIONS and PREPRINTS

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1. A. Ananthanarayanan, S. Senivarapu, and A. Murari, 'Towards Causal Interpretability in Deep Learning for Parkinson's Detection from Voice Data', *medRxiv*, 2025.
2. A. Ananthanarayanan, B. Hu, and A. Sha, 'Network-Based Kidney Allocation Simulation: Evaluating Organ Matching Strategies in Variable Hospital Networks', *bioRxiv*, 2025.
3. A. Ananthanarayanan and J. Liu, '(Tagged) Centroid-based Hierarchical Ordered Processing for Summarization'. *OSF Preprints*, 2025. Submitted to CENTERIS SCIKA 2025.
4. A. Ananthanarayanan, 'Generating Medical Diagnostic Scenarios with LLM-Based Reinforcement Learning Feedback: Dataset Release and Methodology'. *OSF Preprints*, 2025. Presented at IEEE ISEC 2025, in press with IEEE Xplore.

## PROJECTS

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| Towards Causal Interpretability in Deep Learning for Parkinson's Detection from Voice Data   | <i>Apr 2025</i>            |
| <ul style="list-style-type: none"> <li>- Developed a comprehensive deep learning framework for Parkinson's Disease detection from voice recordings, implementing CNN, MCD-CNN, and few-shot learning approaches that achieved over 90% classification accuracy and identified key vocal biomarkers (NHR, RPDE, jitter) through causal feature analysis.</li> <li>- Covered by the <a href="#">New Scientist magazine</a> and <a href="#">Stars Insider</a>.</li> </ul> |                            |
| Efficient Epistemic Uncertainty Estimation for Geohazard Segmentation via Monte Carlo Dropout-Enhanced LinkNet   | <i>Apr 2025 – Present</i>  |
| <ul style="list-style-type: none"> <li>- Collaborated with Matteo Horváth and Mozer János as a part of the Mesh Builder Launchpad program to build a Monte Carlo Dropout-enhanced Bayesian LinkNet for uncertainty-aware landslide segmentation.</li> <li>- Model achieved top precision (82.50) and a competitive F1-score (83.17) while reducing inference time by 3.8× compared to Bayesian UNet for efficient uncertainty-aware geohazard detection.</li> </ul>    |                            |
| Network-Based Kidney Allocation Simulation: Evaluating Organ Matching Strategies in Variable Hospital Networks   | <i>Mar 2025 – Apr 2025</i> |
| <ul style="list-style-type: none"> <li>- Developed a network-based simulation to evaluate kidney allocation strategies and transplant outcomes.</li> <li>- GitHub repository accessible at <a href="https://github.com/AniruthAnanth/kidneybench">github.com/AniruthAnanth/kidneybench</a>.</li> </ul>   |                            |
| T-CHOPS: (Tagged) Centroid-based Hierarchical Ordered Processing for Summarization   | <i>Mar 2025</i>            |
| <ul style="list-style-type: none"> <li>- Led research under <a href="#">Dr. Jianguo Liu</a> to develop a simpler extractive text summarization algorithm for use in large language model processing pipelines involving large text corpora.</li> <li>- Submitted to the CENTERIS SCIKA 2025 conference.</li> </ul>   |                            |
| SPARCS: Spectral Processing and Analysis for Recognition of Chemical Species   | <i>Nov 2024 – Present</i>  |

- Led research under [Dr. Guru Khalsa](#) on the application of advanced AI and machine learning techniques in solving real-world problems in healthcare and environmental monitoring.
- Investigated and applied deep learning algorithms to extract meaningful insights from complex data, including Raman spectra for metabolic profiling and pollutant detection.
- Published research findings in internal reports and presented findings at team meetings, contributing to ongoing AI initiatives in healthcare diagnostics and environmental monitoring.
- GitHub repository accessible at [github.com/AniruthAnanth/SpectroscopyAnalysis](https://github.com/AniruthAnanth/SpectroscopyAnalysis).

#### Exploiting Hidden $sl(2, \mathbb{R})$ Symmetry for Bond Pricing in the Black–Karasinski Model *Feb 2025 – Present*

- Led research under [Dr. Michael Hanson](#), uncovering a hidden  $sl(2, \mathbb{R})$  symmetry in the Black–Karasinski model for efficient bond pricing.
- Developed a novel analytical framework using representation theory to diagonalize the model's generator, significantly reducing computational time while maintaining accuracy.
- Demonstrated the approach's applicability through comparison with traditional numerical methods, achieving faster solutions for bond pricing.

#### Generating Medical Diagnostic Scenarios with LLM-Based Reinforcement Learning *Jan 2025 – Feb 2025* Feedback: Dataset Release and Methodology

- Developed a dataset of diverse and inclusive medical diagnostic scenarios using large language models, reinforcement learning with AI feedback (RLAIF), and retrieval-augmented generation (RAG).
- Addressed gaps in medical education by ensuring greater representation of underrepresented populations in diagnostic cases.
- Submitted, accepted, and presented at IEEE Integrated STEM and Engineering Conference 2025.

#### Fast Python Transfer Matrix Method *May 2024 – Aug 2024*

- Developed a high-performance transfer matrix method (TMM) algorithm for computational electromagnetics under [Dr. Guru Khalsa](#) as part of the TAMS Early Summer Research program.
- Explored machine learning integration for optimizing thin-film coatings in solar panels.
- Presented at the Texas Junior Academy of Science, placing 3rd in the Computer Science/Math category.
- GitHub repository with original code and ports in various languages accessible at [github.com/AniruthAnanth/LightweightTransferMatrixMethod](https://github.com/AniruthAnanth/LightweightTransferMatrixMethod)

## HONORS, ACHIEVEMENTS, and AWARDS

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International High School Academic Research Competition Finalist	2025
Lift Off Grant Recipient	2025
Mesh Builder Launchpad Cohort 1	2025
Beta University Pre-accelerator Cohort 8	2025
TXSEF State Finalist	2025
Physics & Astronomy Category 2nd Place – FWRSEF	2025

Business Professionals of America National Leadership Conference Qualifier in Medical Diagnostic Coding	2025
2x DECA International Career Development Conference (ICDC) Qualifier	2024 & 2025
USACO Silver	2025
Cyberpatriots Gold National Semifinalist	2024
3rd Place, Computer Science Category – Texas Junior Academy of Science	2024
National Merit Qualifier; PSAT 1520	2024
AP Scholar with Distinction	2024
TMEA UIL Solo & Ensemble State Qualifier; <i>Barber, Cello Sonata, Op. 6 Mvmt. II</i>	2024
Isshinryu Karate Black Belt	2023