

Junru Zhou

Having studied Computer Engineering, I have received some of the most rigorous training at the University of California, Santa Cruz, and the University of California, Irvine. The strong curriculum with courses focusing on algorithms, programming languages, software engineering, and computer systems, has laid for me a solid foundation in adopting system-level perspective and problem-solving skills for both real-life and simulated scenarios. But the real education occurred when I took this knowledge and applied it to a variety of projects. In these hands-on contexts, I honed my mastery of programming languages such as Java, Python, C, and C++, and tools such as Git, TensorFlow, and Firebase, among others. For example, I developed a proxy server that would manage HTTP requests from clients through seamless conversion into HTTPS requests and implemented an access control list-based request filtering system to optimize network performance. With my hard work and continuing education, I have received the Dean's Honor and have accomplished a GPA of 3.31 out of 4, and I finished my undergraduate degree in four years. During my graduate study, I extended my knowledge based on what I learned during my undergrad to areas such as Computer Vision, Machine Learning, and Network Science. I have accomplished a GPA of 3.40 out of 4. This academic experience, I believe, is strong proof of my qualifications to become a worthy candidate for your program.

During my undergraduate studies at the University of California, Santa Cruz, I encountered a significant academic obstacle related to the C programming language. The sudden global pandemic necessitated a shift to online learning, which presented

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unique challenges for mastering the intricacies of C, a critical subject in my Computer Engineering program. Unlike traditional in-person classes, C programming demanded a deep understanding of syntax, data structures, and low-level memory management. Unfortunately, the online environment made it difficult for me to grasp these fundamental concepts effectively. I recognized that adapting to online learning required a different set of skills and strategies. So, I decided to take a proactive approach to address this challenge. In July 2021, I took the initiative to apply for a teaching assistant (TA) position for C Programming and Data Structures, both of which I had excelled in previously. As a TA, I was responsible for conducting weekly discussion sessions, answering students' questions, and reviewing key course materials related to C programming. To fulfill my role effectively, I adopted a rigorous approach to my learning. I revisited the course materials, collected various examples, and sought clarification from professors on topics I had previously found challenging. This thorough preparation enabled me to explain complex concepts to students clearly and concisely. This hands-on experience improved my own C programming skills and made me more aware of potential pitfalls in my coding practices. Beyond technical skills, my role as a TA also honed my communication, leadership, and presentation abilities.

In my role as a research assistant in Professor Qian Chen's lab at UCSC, I collaborated on a Computer Vision project, "Identity Tracking with Little Training," focusing on person tracking using Convolutional Neural Networks and Vision-RF Fusion. Initially challenged by my limited knowledge in Machine Learning, I proactively enhanced my

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skills through an Applied Machine Learning class, mastering tools like TensorFlow, pandas frame, and NumPy. My responsibilities ranged from data collection and preprocessing to troubleshooting hardware issues, notably with an Xbox camera. I contributed to model refinement by identifying and correcting data inaccuracies, leading to improved model accuracy and noise reduction. This experience not only deepened my understanding of Computer Vision and its practical applications but also sharpened my programming skills and problem-solving abilities, fueling my passion for further exploration in this field as I pursue doctoral studies.

Engaged in the development of the Long Marine Lab Stranding Map project, I played a significant role in bringing this geospatial data visualization initiative to life. Leading a team of four developers, I adopted Scrum methodologies, ensuring efficient collaboration and on-time project delivery. Our objective was to create a comprehensive database visualization map to track cases of stranded marine life. On the front end, I worked extensively with JavaScript and React to design user-friendly layouts. Leveraging the power of Mapbox GL, we incorporated robust mapping functionalities into our project, ensuring that users could interact with the data effectively. Meanwhile, on the backend, we harnessed the capabilities of Node.js to manage data efficiently. Our database management was a critical aspect of the project's success. To this end, we made use of Firebase and Algolia for indexing and retrieval, ensuring that users could access information swiftly and accurately. Throughout the development process, I collaborated with my teammates, conducting peer code reviews to identify and address

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bugs while also optimizing our database management strategies. Efficient task management was vital to project's progress, and we achieved this using Jira. Moreover, for seamless code collaboration and version control, we relied on GitHub, enabling our team to keep track of code changes effectively. Our collaborative efforts and dedication to the project paid off, resulting in a powerful tool for tracking stranded marine life cases. As we move forward, we remain focused on enhancing the project by adding new features to meet the evolving needs of our users. This experience enhanced my ability to work in a team and manage tasks effectively.

After careful consideration, I find the Ph.D. program in Computer Science at Columbia University aligns seamlessly with my academic background, research interests, and professional aspirations. Columbia's collaborative ethos and its integration within a broader academic and professional network present an ideal setting for interdisciplinary research and innovation. It presents the ideal environment for me to grow as a researcher and innovator, contributing to the field of computer science while also gaining invaluable knowledge and experience. I am eager to embark on this next phase of my academic journey and contribute to the dynamic research community at Columbia. In the long term, I want to develop myself to become a good engineer, delivering interesting and useful ideas or products for society.

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The sudden global pandemic necessitated a shift to online learning, which presented unique challenges for mastering the intricacies of C, a critical subject in my Computer Engineering program. Unlike traditional in-person classes, C programming demanded a deep understanding of syntax, data structures, and low-level memory management. Unfortunately, the online environment made it difficult for me to grasp these fundamental concepts effectively. Instead of succumbing to the difficulties, I decided to take a proactive approach to address this challenge. I recognized that adapting to online learning required a different set of skills and strategies. In July 2021, I took the initiative to apply for a teaching assistant (TA) position for C Programming and Data Structures, both of which I had excelled in previously. This decision marked a turning point in my academic journey. As a TA, I was responsible for conducting weekly discussion sessions, answering students' questions, and reviewing key course materials related to C programming. To fulfill my role effectively, I adopted a rigorous approach to my learning. I revisited the course materials, collected various examples, and sought clarification from professors on topics I had previously found challenging. This thorough preparation enabled me to explain complex concepts related to C programming to students clearly and concisely. Furthermore, assisting students with debugging and troubleshooting their C code allowed me to gain a deeper understanding of common programming errors and their solutions. This hands-on experience improved my own C programming skills and made me more aware of potential pitfalls in my coding practices. Beyond technical skills, my role as a TA also honed my communication, leadership, and presentation abilities.

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marine conservation. As we move forward, we remain focused on enhancing the project by adding new features to meet the evolving needs of our users, especially as online coursework for the upcoming quarter presents new opportunities and demands. This experience enhanced my ability to work in a team and manage tasks effectively.

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