Dear Sir/Madam,

Having always been passionate about math, I wanted to pursue an academic discipline that would be deeply rooted in mathematics and at the same time have enormous impact on society, which is why I decided to pursue machine learning.

My obsession with math began in childhood when I discovered I could perform arithmetic calculations in my head with lightening speed. Building on my interest, I continued exploring and investigating speed math, eventually reaching a point where I began to invent my own techniques. One such technique has been recognized by the Mathematics Association of America where it appeared in one of its journals coauthored with the world's fastest calculator - Dr. Arthur Benjamin. My other techniques have been published in an online journal on Vedic Mathematics and can also be found on my blog https://rohanchandra306.wordpress.com/.

My fascination with mathematics extends to teaching. At the University of Maryland I am a teaching assistant for the course of Discrete Mathematics. I love teaching math through unconventional teaching paradigms. My students love it when I frequently teach them some of my speed math techniques. Last semester, I received amazing TA evaluations from my students. Here are some of their comments - *"Best TA I've ever had. Every second of discussion was helpful and every question I asked was answered. Favorite TA!", "Rohan was the best TA ive ever had, he was so helpful and knowledgeable about the subject. He always tried to help out the students and actually cared if we learned the material"*. All comments can be read here: (https://rohanchandra30.github.io/assets/images/comments.png)

At your program I wish to gain relevant research experience in machine learning so I can obtain a holistic view of various sub-domains of machine learning enabling me to choose a thesis topic which I am passionate about for my PhD. I have worked on the following problems in the past:

- Phase Retrieval (https://arxiv.org/pdf/1711.10175.pdf)
- Low Rank Matrix Recovery
- Texture Synthesis with Recurrent Variational Auto-Encoders (https://arxiv.org/pdf/1712.08838.pdf)

I am currently working on a review paper for phase retrieval where I will be investigating two very interesting theoretical questions. The first question concerns initializers and their role in phase retrieval. The second question focuses on implicit regularization in phase retrieval. To answer the second question, I'm going to try and extend the results from a recent paper by authors at Princeton that introduces implicit regularization in phase retrieval.

In conclusion, I feel I am a strong candidate for the Microsoft AI Residency Program as my interesting combination of skills and background in non convex optimization research distinguishes me from other candidates. I sincerely thank you for your consideration and look forward to speaking with you soon. Please don't hesitate to contact me in case of any questions.

Yours Sincerely,
Rohan Chandra