

Statement of Purpose

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I am writing this Statement of Purpose with immense enthusiasm for the opportunity to work with Precog. As someone deeply interested in graphs, mathematics, artificial intelligence, and theoretical computer science, I find the research directions at Precog perfectly aligned with my interests and professional aspirations.

Why I Want to Work with Precog, and what I will benefit by working here

Precog's focus on research in graph-based learning systems and graph neural networks resonates strongly with my academic interests. I am particularly intrigued by your work on **Graph Explainability**, which aims to integrate higher-order structures for improved accuracy and scalability. I am also interested in the description of Graph poisoning that was talked about by one of the researchers at Precog, during the Info session. I feel like it also inclines with my degree (CND) is the application of networks in every kind of sciences. The kind of work on networks that is done in Precog would have immense implications in the sciences, especially in Network Biology(Protein Contact Networks, Protein Protein Interaction Networks, Metabolome Network, etc.) and I feel that the intersection would be something very interesting to work on.

Apart from that, I feel like the intersection of Math and AI is something that is very interesting. Interpretability of models is something I haven't explored but I would like to explore the domain. I am open to exploring and understanding the various kinds of work that is done at Precog, and would love to take discussions forward with some seniors who talked about their work at the Info Session.

Additionally, I feel like the opportunity to work with some of the brightest minds, not just in IIIT, but in all of India, would be an opportunity that one should not miss. The kind of work that Precog and Prof PK are doing inspire me, to say the least. Moreover, the success of Precog alumni, many of whom have gone on to pursue higher studies at world-renowned institutions like CMU and Stanford, reinforces my belief that being part of Precog would be a transformative experience and a significant step towards achieving my academic and professional goals and aspirations.

Why I Am the Best Candidate

I bring a strong foundation in discrete structures and graph theory. My academic background includes a solid understanding of *data structures and algorithms*, and computational modelling, all of which contribute to my analytical rigor and problem-solving skills. Furthermore, I have proficiency in Python and am comfortable working with libraries such as NetworkX, which are pivotal for graph-based research.

For example, in a recent project(unofficial) under Prof Chittaranjan Hens, I explored the dynamics of information flow in simulated networks, where I analyzed how graph structure influenced the diffusion of messages, and tried to reproduce results from his paper on the same topic. This aligns closely with your work on **Infonets** and **Knowledge Graph Reasoning**, where understanding network architectures and semantic relationships are fundamental.

Beyond technical expertise, I bring a collaborative mindset, and a genuine urge to learn and work, for I feel that I have much that I can learn from Prof PK, and also the seniors at Precog. I think that is the most important thing for any research endeavour to be successful, and I seriously believe that I have the non-technical skills to do it.