**Summarize of the project**

The project aims to enhance the integrity and reliability of scientific communication by detecting citation anomalies through hyperbolic geometry, specifically leveraging the Poincaré ball model. Citation anomalies—such as misrepresented or irrelevant references— undermine the credibility of scholarly work. Traditional citation analysis methods are labor-intensive and susceptible to biases, highlighting the need for automated solutions essential.

To address this challenge, the project introduces a novel approach that utilizes hyperbolic embeddings to capture the hierarchical structures of citation networks. These embeddings effectively model the exponential growth of relationships in scale-free networks, such as scholarly citations. The proposed model, inspired by the DynHAT framework, comprises three key components: Hyperbolic Structural Attention (HSA), Position Embedding, and Anomaly Detection using Isolation Forest. HSA extracts node features and embeds them in hyperbolic space, employing attention mechanisms to emphasize meaningful connections. Position embeddings incorporate temporal context, enabling the model to track shifts in citation behavior over time. Finally, anomaly detection identifies papers exhibiting irregular citation patterns, such as abrupt increases or declines in influence.

The model's performance will be assessed by introducing controlled perturbations into citation networks to evaluate its anomaly detection capabilities. Expected outcomes include the identification of at least 80% of anomalies, and the demonstration of the framework's effectiveness. By integrating hyperbolic geometry with dynamic graph analysis, this research provides a scalable and accurate approach to identifying citation misuse, thereby improving the evaluation of scholarly networks.