



## DEPARTMENT OF HISTORY

INDIANA UNIVERSITY  
College of Arts and Sciences  
Bloomington

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To Whom It May Concern:

I write to offer my strongest possible support for Dilip Nikhil Francies. It is not too much to say that Dilip is among the very best students I have ever worked with in my thirteen years at Indiana University. It is not just that he is razor-sharp. He takes the initiative, can boil down complicated ideas to their essence for people (like myself) who are not data scientists, and works well on teams. My research has begun moving faster and with greater rigor since Dilip joined the team.

Dilip and I have been working together since May 2024, when he joined my research team. Our group is developing new, non-destructive techniques for identifying the provenance of ivory carvings. I am a historian with an interest in reconstructing the historical ivory trade; other members of the team are biologists, physiologists, art conservators, and archaeologists. I hired Dilip to join the group as one of our two data scientists

He has been indispensable ever since. We have been testing elephant ivory samples with a spectrometer, gathering data on the elements within the material, and hunting for patterns. Are the ratios of detected elements in elephant ivory from South Africa, for example, different from the ratios found in ivory from another country? And how best could we model our results?

I had suggestions when I first asked Dilip to tackle these questions, and I suggested lines of analysis. Dilip wondered whether a more open-ended approach might be a better way to start. He wanted to get to know the numbers better—and he proceeded to spend a week running a battery of tests on our data, learning the strengths and weaknesses of the various approaches on the table, and assessing the power of my original suggestion in light of this broader analysis. Dilip ultimately designed a sophisticated neural network model to evaluate our data—one designed to maximize its usefulness and accuracy without overfitting it.

Most graduate students I have worked with need step-by-step coaching. Not Dilip: He is the rare student who takes the initiative; he acts more like a resourceful colleague than a pupil. Meetings with Dilip are accordingly efficient. We discuss a problem, he listens carefully, asks questions to make sure he understands both the immediate task and the overarching goals, and then sets himself to the problem. When we meet the following week, he has the required analysis, but he has invariably taken it on himself to explore a secondary or tertiary approach as well. He clearly enjoys the work and the challenges that come with it.

Beyond modeling our spectrometer data, Dilip has been working on a range of other tasks these past nine months. He learned to scrape data from the web to generate new datasets of

collected ivory carvings in the United States; he then helped analyze the data to determine the production date and country of origin for each carving—all 12,000 in the dataset. In retrospect, I now realize that the task was a bit too easy for him. He's now taking on a bigger challenge: using neural networks to analyze the dimensions of the objects and other factors to, again, model the likely elephant populations behind each carving.

Others with similar talents and skills might be overbearing or impatient; after all, he spends much of his time communicating with historians and scientists who lack his background in data science. One of Dilip's most welcome skills, however, is his ability to work well with the team. He is a good listener, is extremely good at translating technical language into layman's terms, and he asks the right questions. Others on the team have sometimes started drama. Never Dilip. He gets along well with everyone. I look forward to our meetings (and even to joking around with him in the minute or two before work begins).

For all of these reasons, I have no doubt that Dilip would make a formidable and creative contribution to any team he joins. He is easily among the top students I have worked with at IU. My only regret is that he'll have less time for our own project after he graduates!

Please feel free to contact me anytime if you have any questions about his application. I'm available by email, phone, or Zoom, and I would be happy to speak on his behalf anytime.

Sincerely,



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