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2021 Data Scientist Application

To whom it may concern,

I am a Ph.D. candidate in mathematics at Colorado State University (CSU) and I expect to graduate in spring 2022. After so many years of school I have become jaded with the academic world. I love learning, I love research, and I love teaching, but, the truth is, I do not fit in to the environment. Honestly, I have long thought about reaching out to LMG in hopes that the group would desire a mathematician or physicist to collaborate with. Sticking with clichés, LinusTechTips videos have been an inspiration of mine since I was a young teenager. They are, by in large, what led me into starting a computer engineering degree as a college freshman. Since the channel taught me how to spec and build computers, as a sophomore was able to get hired alongside my best friend (who I met because of this degree path) to build about 20 computers for our school's senior design lab which hundreds of students have used since. Alas, I did not enjoy engineering classes so I changed majors to physics and mathematics and then stayed at CSU for graduate school. To this day, I still find computer hardware fascinating and conjecture about the utility of my thesis research in applications like graphics processing. Anyway, with this position open, I now see a chance to sneak my way in.

Data science is a catch all term which, at least to me, just means extracting useful information from a large noisy pool of data. So long as you point me in the direction I should be looking at, I have full confidence I can figure out the rest. My thesis is not in this subject, but it combines the topology, geometry, and algebra of tensors and Clifford algebras on manifolds. Many of the bleeding edge data science techniques rely on extracting information through algebraic decomposition of tensors since data often presents itself in a multilinear (tensorial) way. Data often has underlying topological and geometric structure of a manifold [1] and there is amazing intuition from my field waiting to be used here. To gain exposure in applied mathematics, I work with a handful of collaborators on data assimilation. Our goal is to develop novel techniques that combine data reduction algorithms for high dimensional time series data to make predictive particle filtering algorithms more tractable. That group applies this mostly to atmospheric and oceanic systems, but with others I have used similar techniques for COVID-19 modeling, and on my own I have used similar tools for analyzing price movement of equities.

As I get nearer to graduation, I am working on developing more technical skills by using new software to model equity price action since trading and investing are some of my favorite hobbies. For instance, I plan to use Granger–Var to study causal influence in the stock market as well as TensorFlow to identify price trends. Since my programming background is likely lesser than applicants, I may be a tortoise in this inevitable race. By choosing me, you are making a long term investment under the premise that my mathematical background will allow me to easily pick up on any new content and understanding of the most up to date tools. To ease this strain, I would love to mention the Curry-Howard correspondence. It is a wonderful mathematical result that tells us that any proof is equivalent to a computer algorithm. Hence, one can think of the structure of a thesis filled with lemmas, theorems, and their proofs is an embodiment of software design. As I have matured mathematically, it has been astonishing to see more connections like this and share them with others.

In the past four years I have given over 15 research talks, organized seminar groups, and written an open sourced textbook along with Matlab code examples to teach chemistry and physics majors mathematics. Being both a researcher and teacher, I am well practiced in communication and collaboration and multiple times a week I find myself in front of large groups of people sharing new ideas or presenting concepts I have mastered. The role of teacher has taught me compassion especially in recent times with new levels of mental health issues. I want what is best for everyone I surround myself with and I want them to be happy and healthy. I want to be the best I can for your company and watch it continue to grow beyond expectation.

I look forward to hearing back from you and seeing what comes next for Linus Media Group.

Sincerely,

Colin Roberts

[1] `https://www.youtube.com/watch?v=Zuv_nc7s9mA`, Datasets have shape