ELIOT AYACHE

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Wednesday March 29th,

Dear Henrik Kenani Dahlgren,

Carbon dioxide concentration in the atmosphere has risen by more than 50% in the last 60 years. Electrical power holds a strong potential in reaching net zero carbon emissions, provided that the energy storage solutions are green as well. As I am looking for the next step in my career, and as I yearn to take part in the green energy revolution, the pioneering role of Polarium as a forerunner in intelligent energy storage solutions makes me very enthusiastic about reaching out to you.

Currently, I am a postdoctoral researcher in computational astrophysics at Stockholm University. This experience as a scientist shaped my critical mind which allows me to question and interpret the validity of the results that I obtain. Throughout my career, I've acquired experience in Machine Learning, Optimization, Data Mining, Simulations, Scientific Data Analysis and Dynamic Modeling, that I can readily apply to any quantitative field. This includes data exploration involving complex modeling on large datasets of images, labeled data and time-series, in which I had to make sense of data from disparate sources from a large diversity of observing facilities (photon count rates, radio observations, gravitational wave data). I have modelled this data with various ML techniques from convnets and self-supervised variational autoencoders to UMAP. In particular, I have carried out unsupervised clustering and forecasting of sparse time-domain astrophysical data. I have also worked to extract physical understanding from these ML representations by building and fitting physical models using Bayesian methods. For the same purpose, I invented a range of algorithmic methods and carried out HPC numerical simulations (Monte-Carlo, finite-elements, PDEs solvers). In particular, I developed from scratch a massively parallel numerical relativistic fluid dynamics code in C++ during my PhD. As I strive to always find new angles to solve the problems I'm faced with, I have stayed up to date with the progress in ML and numerical simulation methods, by presenting results and chairing sessions at international conferences.

I thrive in collaborative environments as well as specialised teams, in particular if I can learn from others, and especially enjoy interfacing with the end users of the solutions I develop. I also have strong written and verbal communications skills, having written scientific articles and presented at international conferences and outreach events. I have shown my grit and motivation, as the leader of several of my current research projects. Finally, my training as an engineer at a top Grande École in France gave me some experience of business processes and methods in industry. My Bachelor in Physics and Chemistry, and subsequent training and work as a physicist specialized in light-matter interaction, will allow me to pick up very quickly on the electrochemistry of the systems developed at Polarium.

As such, joining Polarium would be for me an ideal way of combining the knowledge I've acquired from academia and my experience in research, with my motivation to work on more concrete, fast-paced and people-oriented projects.

In the hope of hearing from you soon,
Sincerely,

Eliot Ayache