I am applying for the permanent post of Senior Physical Scientist, to work with the Nanoparticle Inhalation Research Group. I believe that I am well qualified for this role and I would really appreciate the opportunity to work with the Centre for Radiation, Chemical and Environmental Hazards at Public Health England.

My background is in researching optical and physical properties of aerosol particles as well as studying aerosol processes in the atmosphere. During my PhD I worked in the Bristol Aerosol Research Centre (BARC) where I built several instruments including a single particle Bessel beam optical trap. This instrument allowed me to optically contain individual particles that were often smaller than a micrometre in diameter. I could then change the conditions around the particle to observe changes in the particle size and infer changes in composition. During this time I wrote, and had published, three first author scientific papers about my research. I also attended three conferences, including the European Aerosol Conference where I delivered an oral presentation, and a Faraday Discussions meeting where I presented a poster.

After finishing my PhD in Bristol I moved to Boulder, Colorado (United States) where I am currently working with the National Oceanic and Atmospheric Administration (NOAA) as a research scientist. Whilst at NOAA I have attended several conferences but most notably, I presented a poster at the American Geophysical Union in December 2015. One of my main roles in NOAA has been developing a cavity ring-down spectrometer (which measures aerosol attenuation or extinction) with a photoacoustic spectrometer (which measures aerosol absorption). This instrument is able to sample ambient aerosol particles on the ground or in an aircraft. Using this instrument we are able to measure several important properties of the aerosol in-situ and in real-time. Most notably, it allows measurement of the single scattering albedo of an aerosol sample which indicates whether it will warm or cool the air around it. Whilst at NOAA, I have been developing this instrument in a variety of ways, from changing plumbing and performing optical alignment (directing lasers) to optimising the calibration process. Last year I helped to plan a deployment of the instrument, taking some ambient ground measurements where we sampled the air in the city of Boulder. During that time I operated, maintained and improved the instrument design and data acquisition software.

My second major role at NOAA has been in data analysis; developing procedures for analysing large data sets taken during flight measurements of the SEAC4RS (Studies of Emission, Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys) campaign in 2013. I used these procedures to process and apply calibrations to raw photoacoustic and cavity ring-down data from these flights. I then combined the data with those taken by other groups on the same flights to determine the radiative impact of the aerosol that we sampled. In addition, with the aid of researchers at other institutes, I compared each of the different absorption measurements taken during the flight and am currently writing a scientific paper on their agreement and what it will mean for the aerosol community.

All through my time working in Bristol and at NOAA, collaboration and communication have been a very important part of my work. No one person has the expertise and instrumentation to solve the issues of climate and health that we wish to understand and overcome. As such, I have always done my best to involve outsiders in my work and to talk to as many people about a given problem as possible. During my time at NOAA I helped to organise an inter-comparison between our photo-acoustic spectrometer and another absorption instrument that belonged to a different group. The collaboration is ongoing and will continue after I leave.

In addition to collaboration I believe that a sociable and friendly workplace is very important for my personal health and productivity. Whilst at NOAA I have organised numerous work social events ranging from hiking and skiing to organising a retirement party. At NOAA, I also strongly felt that many junior researchers need a forum to talk about their work in a judgment free environment. As such, I and several of my fellow researchers started a series of seminars where young scientists could come and discuss ideas and problems over lunch, without feeling judged by senior scientists.

The Toxicology Department of PHE is an institute whose research I would very much like to be a part. As a researcher, and asthmatic, I’ve always been very interested in the health impacts of human made aerosol particles and I would be excited to use and expand my knowledge of aerosol processes.