Dear Professor Reid,

I am applying for the position of experimental research associate within the Bristol Aerosol Research Centre as I have a keen interest in the advertised role. My background is in researching optical and physical properties of aerosol particles as well as studying aerosol processes in the atmosphere. During my PhD (2011-2014) I worked in the Bristol Aerosol Research Centre (BARC) where I built several aerosol instruments including a single particle Bessel beam optical trap. After finishing my PhD in Bristol I moved to Boulder, Colorado (United States) in 2014 where I recently finished working at the National Oceanic and Atmospheric Administration (NOAA) as a research scientist. Due to my experience in building, operating and developing systems for probing microscopic particles, I believe that I am a good candidate for this position.

My primary research interest is the study of the physical properties of ambient or generated aerosol particles. Most of my research has involved field or laboratory measurements of aerosol optical, physical or thermo-physical properties. These measurements were geared towards better understanding the impact of aerosol particles on radiative forcing and in particular, the impact of light absorbing aerosols such as black carbon. As an asthmatic, I also have a keen interest in the dynamics of aerosols entering the mouth and lungs. As such, I am keen to gain a better understanding of the aerosol properties that are important for delivery of drugs to the lungs.

During my PhD, I built and operated several aerosol instruments, which I used for measuring aerosol optical properties. I also wrote software to interface with these instruments and to do subsequent processing and data analysis. The main instrument I worked with, a single particle Bessel beam optical trap, allowed me to optically contain individual particles between 0.2 and 3 micrometers 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 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.

Whilst at NOAA, I attended several conferences in addition to presenting a poster at the American Geophysical Union in December 2015. My main role at NOAA was developing a combined 8 channel cavity ring-down spectrometer with a 5-channel photoacoustic spectrometer (CRDS-PAS), which can sample ambient aerosol particles on the ground or through an aircraft inlet. The CRDS can measure aerosol extinction under dry, humidified and heated conditions and three separate wavelengths, whilst the PAS measures aerosol absorption under dry and heated conditions. Most notably, this allows real time measurement of the single scattering albedo of an aerosol sample. Moreover, whilst at NOAA, I developed this instrument in a variety of ways including redesigning the calibration and humidification systems. Last year, I helped to plan a deployment of the instrument, taking some ambient ground measurements sampling the air in the city of Boulder. Throughout that time, I operated, maintained and improved the instrument design and data acquisition software.

Another key role during my time at NOAA was 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 (measures aerosol absorption) and cavity ring-down (measures aerosol extinction) data from these flights. I then combined the data with aerosol data taken by other groups on the same flights to estimate the radiative impact of the aerosol sampled. In addition, with the aid of researchers at other institutes, I compared the measurements taken by each of the different aerosol absorption instruments and am currently writing a scientific paper on their agreement and what it will mean for the aerosol community.

Throughout my time working in Bristol and at NOAA, collaboration and communication have been a very important part of my work. As such, I have always done my best to involve outsiders 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 happiness and productivity. Whilst at NOAA and during my PhD, I 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 needed a forum to talk about their work in a judgment free environment. As such my fellowresearchers and I started a series of seminars where young scientists could come and discuss ideas and problems over lunch, without feeling judged by senior scientists. In addition to a group social responsibility, I would be keen to take on minor teaching and/or tutoring roles.

Best wishes

Bernie Mason