Dear Sir/Madam,

I express my interest in the position of XXX. I believe my skills and experience meet the requirements of the post, and my long-term research ambition aligns closely with the direction the project takes. Let me explain why I am a right candidate for this post.

My previous research is under the subject of Digital Rock Analysis, where I integrate multi-length-scale and multi-source image data with stochastic methods to characterize multiscale heterogeneous pore-grain structures in sedimentary rocks. More specific I have developed a generic multiscale characterization and reconstruction workflow underpinned by processing and feature extracting from multiscale 2/3D imaging (e.g. X-ray tomography, Electronic-microscope, Backscattered and Energy-dispersive X-ray spectroscopy etc), correlate characterization of multiscale images and stochastic reconstruction of rock pore and grains. The multi-discipline process involved understanding of complex geological nature as well as imaging nature, image processing, data integration/ fusion and stochastic reconstruction methods.

During this, I developed various image processing and stochastic reconstruction methods in the host a set language and OS: In order to enhance characterizing weak-contrasting geological feature (laminae), I implemented a learnt filter bank based machine learning algorithm in Matlab (under Linux) to enhance the connectivity of linear structures in noisy grey-scale images. To enhance the classification and segmentation of complexly mixed mineral particles from images, I investigated a filter based supervised classification approach, which proved improved segmentation uncertainty management. I also developed a unique set of imaging processing techniques and implemented them in hosting languages within ImageJ (Java) and Avizo (Tcl), for grain and pore characterization, and stand-alone a C program for feature-based multiscale image correlation and registration. I developed a stochastic reconstruction scheme to generate a model with 114003 voxels by employing Multiple-Point Statistics. To generate models of such a size effectively and in a timely manner, I implemented a set of Python scripts for retrieving data and performing reconstructions in parallel. I have also explored Markov-Chain Monte-Carlo simulation. I modified the C++ based code for better analysis 2-phase fluid flow behaviour. Part of the main outcomes from my PhD has been presented at the international conferences and workshops and is being developed into 4 nearly-complete manuscripts to be submitted for publication.

Apart from performing research, I have contributed to the development of research proposals to SINOPEC and CNR international. I have also initialized a new machine learning based project in collaboration with British Geological Survey (BGS) with mutual funding project planned. I involved supervision of 3 MSc students’ individual projects and provide support to 2 PhD visiting students and worked as a team to develop research output. Within the whole processes of industrial collaboration, I have established and maintained a network with industry including CNPC, SINOPEC, CNR International (UK), TOTAL and Research Institute of Xinjiang Oilfield Company.

After work, I have personal hobbies as a developer. I self-developed a Sleeping and Mood Switch, which utilize radio sensor (Walabot) to remotely detect human heart rate and automatically control smart devices based on analyses of the detected signal. It was built in host language of Python and corresponding SDK/API and utilized hardware including Raspberry Pi3, Walabot and relay (the project is published on <https://www.hackster.io/user557511283/sleeping-and-mood-switch-691e96>).

I believe, my background and training would contribute to the core research duties of this post: XXX. This will be contributed by my programing skill set and core research backgrounds I have gained from my PhD: image processing and segmentation, machine learning based image classification and stochastic 3D structure reconstruction by multiple point statistics.

I would be grateful for any opportunity to explain my research skills and experience in details, which I believe would benefit the project, and to discuss the project in more depth. While this statement highlights how my background fit the key duties and my resume highlights qualifications, my enthusiasm and determination can only be revealed during a personal meeting.

I look forward to hearing from you soon.

Best Regards

Chen Jin