THE UNIVERSITY OF UTAH

Scientific Computing and Imaging Institute

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To Whom It May Concern

Re: Reference letter for Mr. Arthur Coste, M.S. candidate

Mr. Arthur Coste asked me to write a reference letter to be included in his future applications for a research and development position. I have known the candidate since July 2011 when he joined our Medical Imaging research group at the Scientific Computing and Imaging Institute (SCI) of the University of Utah. Mr. Arthur Coste comes from CPE Lyon and joined us for the 2011/2012 school year as an internship student. During the second 2012/2013 year, he took the challenge to take advanced graduate courses at the Computer Science department of the University of Utah to fulfill the credit hours for his final M.S. degree at CPE Lyon. Besides attending these graduate courses, he was also working as a research student on ongoing medical image analysis research projects.

During these two years of research as an internship and graduate student, Mr. Arthur Coste did excellent research work which has a significant impact on our collaborative multi-disciplinary projects. He got involved in an ongoing study of autism research using neuroimaging. The novel aspect of this study is its longitudinal design to explore early brain development in infants at risk for autism. This design poses the significant challenge of quality control of image data, and of processing image data repeated over 2 years in order to learn about growth/maturation trajectories of individual infants, but also about comparing infants at risk for autism to infants with no mental disorder family history.

Mr. Arthur Coste developed a web-based system for qualitative quality control of large number of 3D imaging datasets, in particular magnetic resonance diffusion weighed images (MR-DWI) to study brain connectivity and white matter maturation. His development resulted in an excellent tool where the clinical sites can get a quick and efficient overview of their scans, compare quality at each clinical institution, and eventually take action if the scans were not successful. This large-scale screening is absolutely crucial for managing large clinical studies, and Arthur Coste's contribution to our clinical research project funded by the National Institute of Health (NIH) was highly rated by all project collaborators.

The candidate also developed a new concept to study individual subjects by co-registration of 3D scans taken at 6, 12 and 24 months of age, resulting on 4D image datasets (3D volumes over time). These individual 4D datasets were then co-registered into a template space for joint analysis across the whole population of several hundreds of subjects. Whereas this processing pipeline is still in development, it follows the latest trend in medical image analysis to build "individual, personalized atlases" which characterize growth of each infant. This work also led to innovative, novel contributions of Arthur Coste related to quality control of data. MR-DWI imaging is sensitive to subtle motion of subjects but also

small vibrations of scanners. Here, the candidate developed new analysis procedures that can detect and quantify parts of scans which are considered “bad” in order to correct datasets. This research is taken to the next level where he is developing a tool to quantify errors of individual datasets during population atlas-building, and to systematically compare different parameter combinations used for the processing pipeline. All these research contributions are well documented with regular updates which Arthur Coste provided on our internal Wiki research page, including reports, visualizations of processing pipelines and pictures and 3D views of results. Overall, the 2 years of research and development by Arthur Coste provided substantial support of technology development towards our ongoing autism research project. He well demonstrated his excellent computing skills based on strong foundations of knowledge of algorithms and numerical solutions.

Mr. Arthur Coste was also attending two high-level graduate courses which I was teaching. In the CS6640 Image Processing Course in Fall 2012, he did excellent and was among the 5 best students out of 37 students. In the CS6620 3D Computer Vision Course this Spring 2013, he ranks among the 3 best out of 15 students. His assignments and computer science projects were always excellent, reflected his motivation to better understand theory, searching for additional materials, and presenting excellent and detailed reports and also well-documented computer code.

In summary, I am pleased to recommend Mr. Arthur Coste highly for a future position related to computer science and imaging technology development and research. He has clearly demonstrated his strong theoretical and practical background as a computer scientist, his style of working hard and independently to come up with his own solutions, his well-demonstrated skills to work in a team and to communicate research to others, and to quickly capture the underlying issues with new scientific problems and to investigate about optimal solutions. His oral and written communication skills are to be considered as excellent. I therefore strongly recommend Mr. Arthur Coste for a future position and I think he will have an excellent career ahead.

I will be happy to provide additional information if necessary.

Sincerely,

Guido Gerig, PhD