11th February 2020

Dear Selection Committee,

# Re: Reference for Dr Jack Miller’s Application for the Gianna Angelopoulos University Lectureship in Medical Therapeutics

I am delighted to write in the strongest possible terms in support of Dr Jack Miller’s application for the Gianna Angelopoulos University Lectureship in Medical Therapeutics.

I have known Jack since he was an eager graduate research rotation student and he approached me after a seminar independently to define a PhD project spanning multiple disciplines, Departments, and University Divisions. This approach – completely unexpected – came after an illustrious undergraduate degree in Physics that included two publications in mathematical biology and an acknowledgement in a prestigious particle physics textbook. Jack’s graduate studies were focussed on the technical development of a novel imaging technique called hyperpolarised Magnetic Resonance (MR). Hyperpolarsed MR is an innovative technology that has been developed to enhance nuclear spin polarization such that 10,000-fold gains in sensitivity can be achieved in molecules with an *in vivo* stability of approximately 60 seconds. This exciting new technique can improve MR sensitivity and has enabled visualization of 13C-labelled cellular metabolites *in vivo*, and more importantly, their enzymatic transformation into other species. Development of such a novel metabolic imaging method requires a broad range of skills spanning from physics, electronics and programming to chemistry, biochemistry and physiology. Jack possesses all of them, and his graduate work was driven entirely by his own interests.

Jack’s academic career has been exemplary, and I have enjoyed following it. For example, at the start of his PhD, his end-of-first-year report and *viva voce* examination was returned with Examiners’ comments from the Department of Physics indicating his “*understanding and ability was far in excess of that typically found in a graduate student*”; the first major paper he wrote on this work was received by the main journal in the field, *Magon. Res. Med.*, with reviewers’ comments “*thanking the authors for an excellent contribution to the field*”; and his PhD thesis and viva itself was viewed so positively by its examiners that the university-wide Director of the Graduate School wrote to congratulate him personally on his exceptional achievements.

After finishing his PhD with me as one of four co-supervisors, Jack secured a prestigious and highly competitive EPSRC Doctoral Prize Fellowship, only eligible to the top 5% of Graduate Students. This was followed by a competitively awarded Postdoctoral Research Fellowship funded by the charitable arm of the Danish pharmaceutical corporation, Novo Nordisk. These awards have enabled Dr Miller to establish his own independence in his research directions and have supported the translation of the technical methods he developed during his PhD into human subjects. This has resulted in a large number of well-received and high-impact publications, in sometimes quite disparate areas. Dr Miller has also had considerable success in obtaining funding for his work, including EPSRC schemes, a prestigious Novo Nordisk postdoctoral Fellowship, receving funding as a sole supervisor for a Wellcome trust undergraduate studentship, as well as being a joint researcher co-investigator on internal schemes such as the John Fell Fund and supporting coordinate bids put forward by other PIs.

Jack is a highly intelligent and diligent scientist and has great motivation in his work. He is very reliable and approaches challenges with an enthusiastic and positive attitude. Jack attacks problems in a thoughtful and logical manner, leading to a solid and well-considered scientific approach to his research. In his current role has taken on several management level responsibilities including ing taking part in recruitment panels and acting as a board member for the British Chapter of the International Society of Magnetic Resonance in Medicine. He is also frequently asked to review work for the leading conferences and journals in the field including *Magon. Res. Med*., *NMR in Biomedicine*, and the Swiss Government’s Science Foundation.

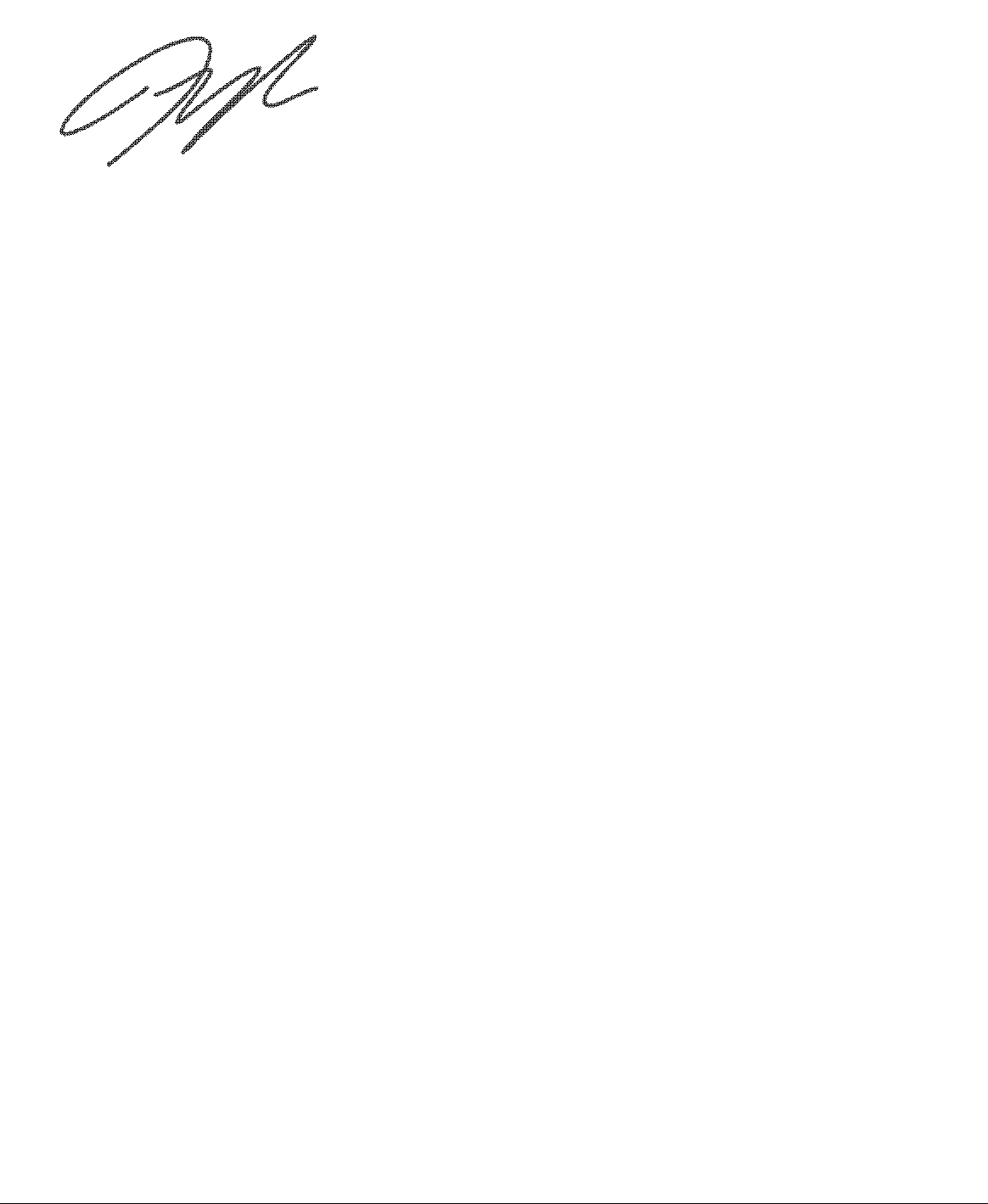
n Associate He currentlyjointly supervises three PhD students and has supervised a number of project and masters’ students, the work of which has won further awards. Jack currently also teaches and lectures, tutorials and classes on a very broad range of subjects including electromagnetism and optics for physics students, statistics for biochemistry undergraduates, and technical aspects of hyperpolarized MRI for the FMRIB “advanced MRI” graduate training programme. As a result of this Dr Miller has become highly skilled at balancing a demanding teaching load with high level research in medical technologies.

Reflecting the nature of medical technology, Dr Miller has good links with industry, and has a documented history of producing ideas that contribute to products that others can use. This had already resulted in a patent for a completely revolutionary type of radiofrequency coil Jack aims to disseminate freely to the scientific community the software and intellectual property that he generates where this is possible or feasible, and his developed methods and GitHub page are used worldwide.

Jack’s work on hyperpolarised imaging methods, techniques and technologies is known internationally. He frequently receives prestigious invitations to speak at a variety of international conferences, most notably ISMRM, and is viewed as having an exceptionally broad and detailed understanding of both MR physics, physical techniques, and their potential applications. It is not an exaggeration to state that he is personally known to every group in the field worldwide, and frequently receives ‘head-hunting’ job offers, e.g. most recently an invitation from Stanford to apply for junior-faculty positions. He is clearly ready to take the next step on the pathway to a stellar independent research career and the support and flexibility of a University Lectureship at the University of Cambridge would both accurately formalise his already extant leadership in the field, and permit him to continue in the UK to push the boundaries of what is measurable in a way that only he can achieve. The link between physics, engineering, and medical technology reflects his interests exactly and is a brilliant fit.

In summary, Jack is a confident and able young scientist with a growing international reputation who, I am certain, would benefit greatly from the unique and prestigious environment that this role would provide him in the critical transition from an early stage researcher to becoming a leader in his field of biomedical research. I consider him to be an excellent candidate for the Gianna Angelopoulos University Lectureship in Medical Therapeutics and recommend him to you without hesitation.

Yours sincerely



Prof. Damian J Tyler, Ph.D.