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To whom it may concern,

It is my pleasure to write this letter of recommendation in support of Dr. **James Maxwell**'s application for the college lecturer position in pure mathematics at St John's College.

My acquaintance with James began when he expressed interest in applying for a Heilbronn Postdoctoral Research Fellowship at the University of Bristol. Subsequently, he assumed his position in September 2022, immediately after completing his PhD. Since then, on many occasions I have observed James style of teaching and have had many fruitful discussions with him regarding mathematics and the organisation of seminars and conferences at Bristol.

Considering his **research**, James has conducted various works in the fields of tropical geometry, general convexity theory, matroid theory, and recently, rigidity theory. In his PhD thesis, James focused on a fundamental result in tropical geometry known as Kapranov's theorem. This theorem asserts that tropicalising a polynomial and computing the corner set yields the same tropical variety as computing the algebraic variety and then tropicalising the algebraic variety. James' main result extended Kapranov's theorem over hyperfields. Subsequently, his single-authored article was accepted by the Journal of Algebra.

James also has two preprints with Dr. Ben Smith, a postdoctoral fellow at the University of Manchester, where they establish basic theorems about convexity over hyperfields. In another article, they establish the Fundamental Theorem of tropical geometry over hyperfields. I expect these works to be published in reputable journals.

Since arriving in Bristol, James has been actively developing his network and collaborations. For instance, he raised a question about the relationship between rigidity theory and tropical geometry, and this question has led to a joint work-in-progress with Dr. Sean Dewar, a postdoctoral fellow in Bristol, and myself, which has recently appeared on Arxiv.

In another work-in-progress, James and his former PhD supervisor, Prof. Jeffrey Gian-siracusa, University of Durham, plan to utilise *tropical modification*, akin to a birational morphism in algebraic geometry, to establish equivalences between the realisable class of tropical varieties. This approach can be understood as reminiscent of the minimal model programme in algebraic geometry for tropical varieties. It is worth noting that understanding the properties of tropical modification and how this operation preserves the Hodge theoretic properties of matroids was also the focus of June Huh and his collaborators in several groundbreaking articles.

In addition to **organising** and co-organising several reading seminars, conferences, and focused research groups, which have been beneficial for researchers and, in particular, postgraduate students in Bristol, James **designed** a postgraduate course on matroid theory

at the Taught Course Centre which is jointly organised by the Universities of Bath, Bristol, Imperial, Oxford, Warwick, and Swansea. James' course attracted considerable interest from postgraduate students in Bristol and across the UK. Through teaching matroid theory, James has shared his knowledge and deepened his expertise in the field. James has great communication skills, and he is a very down-to-earth teacher who always finds very nice toy examples to discuss the theory. I had a chance to meet several attendees of his course at Bristol and Warwick and everyone had enjoyed the course.

In addition to the postgraduate course that James delivered several tutorials of various courses to the undergraduate students at Bristol and received very high evaluations from the students.

In conclusion, I find Dr. James Maxwell's research to be promising, and considering his approachable demeanor alongside his organizational skills, communication abilities, and teaching capabilities, I strongly recommend him for this position.

Thank you for your time and consideration. If you have any questions, please do not hesitate to contact me.

Sincerely,
Farhad Babaei

