



It is my honor to recommend *Caleb Stanford* in consideration for the

Penn Presidential PhD Fellow at University of Pennsylvania: Academic Opportunities

Caleb worked as my Microsoft Research (MSR) intern during the summer of 2020. Caleb showcased an exceptional flexibility and adaptability in performing the whole internship remotely during the pandemic. It is unprecedented to have completed an internship project at MSR entirely remotely. Not only did Caleb achieve and surpass all the internship goals, but the implementation work he did is now an actual part of Z3's string solver (SMT) codebase – Z3 is a leading SMT tool in the world, and the publication related to his internship work has been accepted at PLDI'2021 – *the* leading conference in programming languages (PL) research and applications.

I see Caleb as a rising star in PL research with an exceptionally diverse capacity for critical thinking and creative problem-solving approaches. Additionally, as demanded by the unique pandemic related circumstances surrounding his internship, he showcased an ability to make progress and take charge individually, demonstrating significant leadership potential. Speaking further to his hard-working nature, Caleb has gone above and beyond in continuing collaborative efforts beyond his original obligations with respect to continued weekly meetings.

In terms of global impact and relevance, the field of Caleb's PhD research is related to *streaming computations*. This field is foundational in its role in contemporary cloud computing platforms – a multibillion-dollar industry.

Based on my over two decades of research experience at Microsoft, I view Caleb as being among the best of my former interns, such as Loris D'Antoni who also worked under R. Alur's supervision at UPenn.

With the warmest of regards, please do not hesitate to contact me for further information,

Margus Veanes
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A handwritten signature in black ink, appearing to read "Margus Veanes".

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