



Contribution ID: 427

Type: **Talk**

Classical and Quantum Computational Complexity of the Ramsey Number Problem

Monday, 1 December 2025 13:30 (20 minutes)

Ramsey Numbers are a computationally difficult problem to solve. The expected runtime of any algorithm to find a Ramsey Number is in the computational complexity class of Π_2^P or co-NP^{NP} (Burr, 1987). Here we present some preliminary results from an optimized tree-search algorithm to find the next Ramsey Number $R(4, 6)$ (Radziszowski, 2024) and verify the result $R(5, 5) = 45$ (Tamburini, 2025) using modern parallelisation techniques and improved hardware. We provide an analysis on the efficiency of this parallel algorithm compared to other implementations. We present current progress on generalising the algorithm to find the Ramsey Numbers for general associated structures.

Presenting Author

Brendan Griffiths

Email

2426285@students.wits.ac.za

Student or Postdoc?

Masters

Institute

University of the Witwatersrand

Registered for the conference?

Yes

CHPC User

CHPC Research Programme

Primary author: GRIFFITHS, Brendan (University of the Witwatersrand)

Presenter: GRIFFITHS, Brendan (University of the Witwatersrand)

Session Classification: Special

Track Classification: Quantum Computing