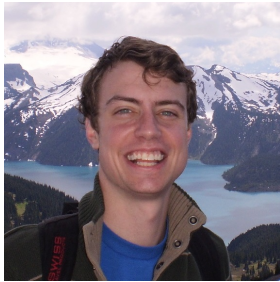




The Math/Stats Colloquium
Department of Mathematics and Statistics
San José State University



Kyle Hambrook

SJSU

*Finding Progressions with
the Fourier Transform*

WED MAR 02, 2022, VIA ZOOM

Abstract: How large can a subset of $\{1, 2, \dots, n\}$ be without containing the progression $x, x + y, x + 2y$? Can it have size $n/2$? $n/100$? $n/1000$? $n/\log(n)$? This simple-to-state combinatorial question is the subject of Klaus Roth's theorem on arithmetic progressions. We'll explain what the Fourier transform is, and how Roth used it to count progressions and prove his theorem. We'll also explain how Roth's theorem is a precursor to the famous theorem of Ben Green and Terence Tao on arithmetic progressions in the primes.

Background: Discrete math (Math 42).

About the speaker: Kyle Hambrook is an Assistant Professor in the Department of Mathematics and Statistics at SJSU. He was a Visiting Assistant Professor and Natural Sciences and Engineering Research Council Fellow at the University of Rochester. He earned his Ph.D. in Mathematics at the University of British Columbia. His research focuses on the Fourier-analytic structure of fractal sets.

COLLOQUIUM BROADCAST VIA ZOOM, 3:00PM PACIFIC

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For our full schedule, see: <http://www.timhsu.net/colloq/>