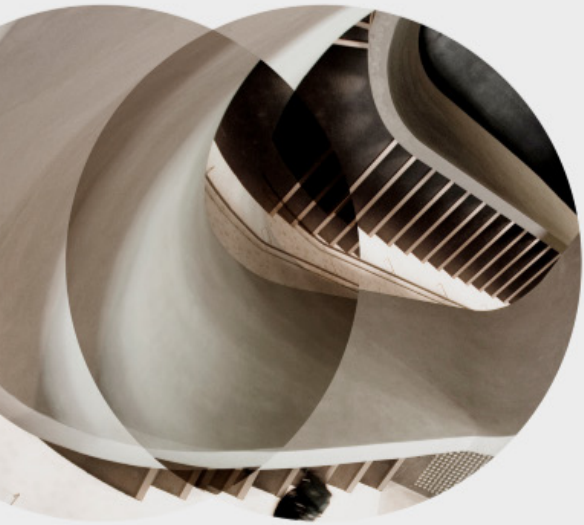
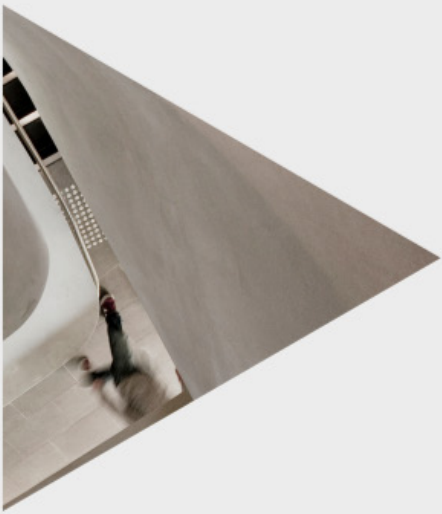
UTS

Faculty of Science

Maths in Music

Wednesday, 7th August, 2019
5:30pm – 7:30pm





Welcome

People often say that Maths and Music go together. Accompanied by UTS's Ensemble-in-residence, the Australian Piano Quartet, Tony Dooley will explore this idea from the point of view of a practising mathematician.

How does harmonic analysis lie in both areas? And what did J.S. Bach mean when he titled his 48 preludes and fugues "For the well-tempered clavier"?

We hope you enjoy listening to some remarkable music spanning three centuries which brings to life the many synergies between the two areas, in the spectacular acoustic of the Vicki Sara Building at UTS.

The Australian Piano Quartet will perform:

J. S BACH Cello Suite in G major No.1 BMV 1007

Paul HINDEMITH Sonata for solo viola (1937)

J. S BACH Trio Sonata in G Major BMV 1027

Image: UTS Ensemble-in-residence, The Australian Piano Quartet

Performance

Johann Sebastian Bach: Suite for solo cello no. 1 in G Major, BWV 1007
Prelude- Allemande – Courante –Sarabande – Minuets I and II - Gigue

Bach composed his 6 iconic cellos suites during the period 1717–23, when he was Kapellmeister in Köthen. They are based on traditional dance movements, and are perhaps the most performed pieces of the solos violoncello repertoire.

Paul Hindemith: Sonata for unaccompanied viola (1937)
Lebhaft Halbe - Langsam Viertel - Lebhaft - Mässig Schnelle Viertel

Hindemith wrote his final Sonata for unaccompanied viola in 1937, by which time he was virtually exiled from Germany and living the life of an itinerant composer-performer. The sonata was dashed down on a train journey from New York to Chicago, and finished on 21 April, the same day he premiered it at the Chicago Arts Club. In contrast to the chromaticism of his two preceding sonatas there is an emphasis on bright intervals, notably the perfect fourth and fifth.

Despite the anxious times in which it was composed, this sonata is in fact the most direct and lyrical of his four unaccompanied sonatas, and its three movements provide the most balanced formal design.

A virtuosity rooted in Hindemith's profound knowledge of the instrument is everywhere apparent: in the alternately pugnacious and tender opening movement; in the central movement, meditative and deeply philosophical polyphony encloses a vigorous scherzo section which flows into a capricious episode of strumming pizzicato, a complete contrast in sonority and texture before the slow music returns.

The finale, in moderate tempo, contrasts serious and formally grave music, almost like impassioned oratory, with a quieter, more reflective central episode. The music rises to a peak of eloquence just before the laconic close.

Einstein once said of Hindemith: "He is unwilling to exploit his feelings publicly and he keeps his two feet on the ground. He merely writes music, the best that he can produce."

Performance

Johann Sebastian Bach: Trio Sonata in G Major BWV 1027
Adagio - Allegro ma non tanto –Andante - Allegro moderato

This work was also written while Bach was Kapellmeister in Köthen. It exists in several different arrangements, for harpsichord and viol da gamba, for cello, for viola and for two flutes. The version we will hear tonight is for string trio.

Performed by members of the Australian Piano Quartet:

Katherine Lukey, violin
James Wannan, viola
Thomas Rann, cello

Formulas

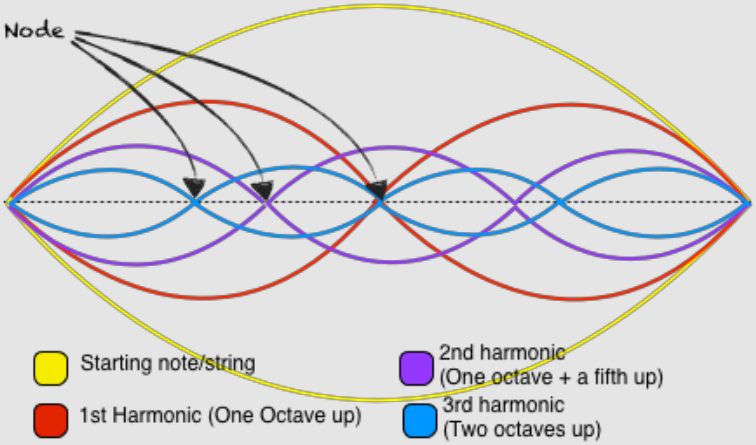
sin(A)sin(B)=1/2(cos(A-B)-cos(A+B))

3^12 = 531441; 2^19 =524288 and 3^12/2^19 = 1.01364326....

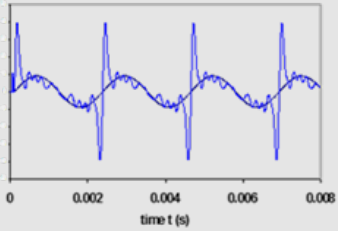
Tempered fifth 2^(7/12)= 1.498031...

Tempered major third 2^(1/3)=1.25992107....

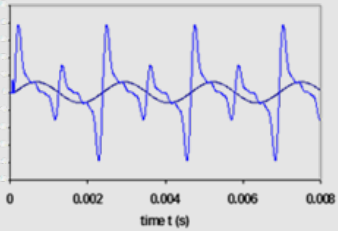
Tartini tones: Play C 256 and A 256 X 5/3: hear bottom F = 256 X 2/3 and top F = 256 X 8/3.



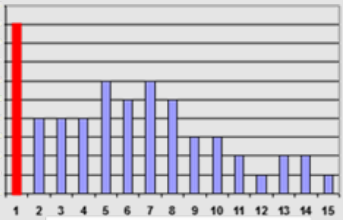
violin recording



viola recording

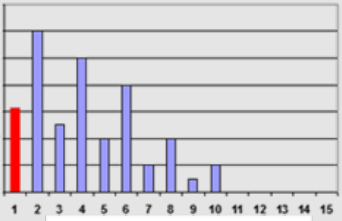


violin spectrum



harmonics (f_1 = 440 Hz)

viola spectrum



harmonics (f_1 = 440 Hz)

About Science in Focus (SIF): SIF is a free public lecture series showcasing the latest research from prominent UTS scientists and researchers.

For more information on our events, visit uts.edu.au/science

Follow us:
Facebook: @UTSScience
Instagram: @UTSScience
Twitter: @UTS_Science