Theme 3 Plenary Lecture Historical Tangents! Original Sources from Trigonometry Texts throughout History <u>Clemency Montelle</u>, University of Canterbury (New Zealand)

Professor Clemency Montelle is the Tumuaki Kura | Head of School: Pāngarau | Mathematics and Statistics at the University of Canterbury, a leadership role she has held since 2020.

She is an internationally recognised research leader in the History and Philosophy of Mathematics. Author of seven books and over one hundred research outputs, her research excellence has been recognised by various awards including the Indian Satish Bhatnagar prize and the New Zealand Mathematics Society Research Prize.



Her research examines the mathematical achievements of early cultures and is carried out by the examination and analysis of primary source material in Sanskrit, Arabic, Greek, Latin, and Cuneiform. She has authored several books in her field including *Sanskrit Astronomical Tables* (2019), *The Sanskrit Astronomical Table Text Brahmatulyasāraņī Numerical Tables in Textual Scholarship* (2020), and *Bloomsbury's A Cultural History of Mathematics: The Medieval Age* (2024).

She is passionate about educating people in the mathematical sciences, and creating a technically literate society able to address the needs of communities, fostering advances in science, technology and the social sciences. She is deeply invested in championing diversity and inclusivity in the mathematical sciences and uses her expertise in historical sources and periods to further this aim.

Abstract

Trigonometry, as we understand it today, carries a rich and intricate backstory that spans across various civilizations over more than two thousand years. Despite its neat presentation in modern mathematics curricula, it is often a challenging topic for students who meet it as a set of abstract analytic functions ultimately deriving from ratios of quantities. However, the history of trigonometry reveals a mathematical concept that, originally conceived of to address the demands of ancient astronomy, has undergone profound transformations and was central to numerous groundbreaking scientific endeavours in a wide variety of contexts. We will consider various original historical sources which testify to a more creative and geometric approach to this field, offering new perspectives to appeal to the imagination of learners to deepen their grasp of the topic.

दे ज्याष्ट चंडां शकानां २ई ख्वीएपतिः पूर्वीक्रेकेद्रीपगस्त्वमध्येकृत्वाई इत्तस्य चकेंद्विन्द्वनोमयेद्वतिएणग 88 सिस्तवं कणिमुकारं घ्रेयमंगतीयी २७ एकविभन्ने भुजकीटिस्ते व्यस्याभिधे स्पृत्रे चविद्यात् कर्णः स्पृशे राव हानाई रुत्ते तराम्प्रिद्वां तरगंधमाणं २० योडुन्द्रिभागे न्मितचापकर्णः स्वात्तस्य खंड धतिभागत्रीवा सिद्य त्यतीज्यार सरामआग हि फ्रेलआगा शिश्रां शजा हा: २९विज्याव गीईती मुलसाई राष्ट्रा स्पकाभवेत् - युव साईभजे जीवें दो : कोटिजा ज्यास्यात्कोरिज्यकावग होनान्युल चदास्थिता १९२अम्मस्य जीदी ज्यां कीटिः कीटिउयका नयाकर्णसि ज्याततः साध के दिदोई परसर २२ अधितनीय कारेचा पज्या ज्ञाने सतित्वा पाई ज्या ता ने ्रदत्तम् नदुपयोगित्वात्तावदुत्क्तसङ्गानयनं कोटिज्यकाव्यासदलाहिश्यम् भू वाह्तकमज्याविशिखविधास्यान् चेह्यासखंडात्यतितामुजज्याकासुक मज्याघभवेनहाली २२ भुजीत्कमज्याक्तनिसंयुतायादीज्याकतर्मूलदलच यन्यान् तदईचापसाभुजज्यकासाकीटिज्यकातीपिनधेवकार्या न्य्रव्यस्त्रजीवास्तिकोटिवीहुज्यादीष्यापकर्सावकर्णः ह यत्कर्णाई सेव्चागईजीवाचापरेनेमर्भनहिलाका ३५ ञ्च यवा स्त्लेचयहासग्ररावघातानदर्दकेवाधनुरर्द्वजीवा