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**Tomoko L Kitagawa\*** (tomoko\_kitagawa@harvard.edu), 2 Divinity Ave, Cambridge, MA 02138. *Math Needs Paper and Imagination?: Embodying the Mathematical Knowledge in 17th century Japan.*

This talk discusses the changes in the mode of calculation in Japan during the 1620s when the oral tradition began to take the form of published booklets for wider distribution. While the first math booklet, the Division, simply recorded the oral chanting method of division, the second booklet, the Unalterable Treatise, introduced further methods of calculations and included pictures and diagrams to explain the solutions. From the above two earliest existent Japanese math books, this talk presents the ways in which mathematics that had always been done in the head went through a transformation: It became something that required paper and imagination starting in the late 1620s.

It was observed by Descartes, Kant, and Heder that intuition and pictorial consciousness were the necessary elements for developing mathematical knowledge. Regarding this theoretical debate, Japanese mathematics booklets show how imaginary diagrams appeared where intuition reached its limit. In other words, I argue that it was the pictorial consciousness, not the intuition, which facilitated the further growth of the methods of calculation in Japan. (Received September 20, 2010)