

Astrolabe Workshop Programme

24-25 October 2022

Çakılları Mathematics Village

Activity 1. Lecture.

Title. Taqi al-Din ibn Ma'ruf on the astrolabe and its construction

Speaker. Jan P. Hogendijk

Abstract. Taqi al-Din ibn Ma'ruf was a mathematician and engineer who became the director of the astronomical observatory in Istanbul in the late 16th century, who was chief court astronomer of the Ottoman Empire under Sultan Murad III. Taqi al-Din wrote a treatise on the astrolabe which has survived in his own handwriting in a manuscript in Kandilli Observatory. This treatise has never been studied by modern historians. We will discuss his methods for constructing the astrolabe by means of geometry and numerical tables.

Activity 2. Workshop.

Title. Workshop on the Use of the Astrolabe

Presenter. Wilfred de Graaf, with assistance of Tom Reijngoudt, Jan Hogendijk

Abstract. The astrolabe is a portable astronomical instrument with which the (apparent) movements of the sun and stars around the Earth can be visualised. Participants of the workshop will receive a model of an astrolabe for the latitude of Istanbul. After an introduction, participants will work in groups on exercises to determine time, find positions and directions of the sun and stars, find prayer times, and find the qibla. In doing so, the participants will realise the depth of the astrolabe from their own experience, and they may also learn some mathematics and astronomy in a hands-on way. Participants can take the astrolabe model and the handout home and explain the instrument to their friends and family members. No previous knowledge of mathematics and astronomy is required.

Activity 3. Workshop.

Title. Workshop on the Abjad Numeral System

Presenter. Tom Reijngoudt, with assistance of Wilfred de Graaf and Jan Hogendijk

Abstract. In this workshop participants will first learn the method by which scientists in Islamic civilization wrote numbers in an Arabic alphabetic numeral system called abjad. Then participants will read in detail the abjad numbers on two or three instruments like astrolabes. In doing so, the participants will better understand these instruments and learn to appreciate the work of its makers more. If time allows, the participants can explore another instrument: an Andalusian astrolabe with an ingenious calendar conversion system in abjad. The Turkish-Islamic scientists used abjad in combination with the sexagesimal system which is still known today for time (hours, minutes and seconds) and angles (degrees, arc minutes and arc seconds). We will show an example in a manuscript by the astronomer Taqi al-Din from Istanbul. All handouts and photocopies of the instruments will be provided and participants can take these materials home. No previous knowledge of mathematics, astronomy, or Arabic language is necessary.