

THE LIFE OF MIRZO ULUGBEK AND THE SIGNIFICANCE OF HIS
SCIENTIFIC HERITAGE

Zarafshan City
Preschool Educational Institution No. 16 Teacher
Mamurova Mashhura Akbarovna
<https://doi.org/10.5281/zenodo.20070488>

Abstract. This article analyzes the life of Mirzo Ulugbek, his activities in state governance, and his scientific legacy. It highlights the development of science during the Timurid period in the 15th century, the transformation of Samarkand into a major scientific center, and Ulugbek's achievements in astronomy and mathematics. In particular, the construction of the Samarkand observatory, the scientific observations conducted there, the content of the work "Zij-i Sultani," and its place in the history of world astronomy are described based on scientific sources. The article also examines the scientific school formed around Ulugbek, his methodological approach, and the connections between Eastern and Western scientific traditions. Furthermore, the importance of Ulugbek's legacy for modern education and scientific development is substantiated.

Keywords. Mirzo Ulugbek, Timurid period, Samarkand observatory, "Zij-i Sultani," astronomy, mathematics, scientific school, Registan, Ulugbek madrasa, star catalog, Eastern Renaissance.

The 15th century in the history of Central Asia is distinguished not only by political events but also by the rise of science and culture. This period holds an important place in history as the Timurid Renaissance. During this time, scientific schools were formed in Samarkand, Herat, and other cities, achieving great success in mathematics, astronomy, architecture, and literature. In this process of scientific awakening, Mirzo Ulugbek emerged as a prominent figure.

Ulugbek's personality is significant in two aspects. First, he was a major statesman who ruled Movarounnahr. Second, he was a professional scholar who made direct contributions to astronomy and mathematics. There are few figures in history who were able to combine the roles of ruler and scientist. Therefore, Ulugbek's activities are studied not only regionally but also globally.

For the development of science, peace, economic stability, and a scientific environment are essential. Ulugbek sought to create such conditions. He supported science not merely as a personal interest but elevated it to the level of state policy. Transforming Samarkand into a scientific center, building an observatory, and developing madrasa education were all part of a clear and purposeful strategy.

The development of astronomy during Ulugbek's time was not accidental. In the Middle Ages, astronomy was closely connected with practical needs such as navigation, timekeeping, determining the direction of the qibla, and creating calendars. Therefore, astronomical observations had both theoretical and practical significance. Ulugbek and his scientific team aimed to address these needs on a solid scientific basis. Today, Mirzo Ulugbek's legacy is valued not only as a historical memory but also as a model of scientific thinking. His observatory and the work "Zij-i Sultani" are considered among the greatest achievements of medieval astronomy.

Mirzo Ulugbek was born on March 22, 1394, in the city of Sultaniya. He was the grandson of the great commander Amir Timur and the son of Shah Rukh Mirza. From a young age, he showed interest in science, especially mathematics and astronomy. He preferred scholarly discussions over military campaigns and court life. From 1409, he began ruling Movarounnahr



and worked to transform Samarkand into a major scientific center. During his reign, Samarkand became not only a political but also a scientific and cultural hub.

Ulugbek's scientific activity reached its peak in astronomy. Between 1424 and 1429, he built a massive observatory in Samarkand, which became one of the largest scientific centers of its time. The main instrument of the observatory was a giant sextant of approximately 40 meters, used to measure the precise coordinates of stars. Ulugbek and his scientific team determined the positions of 1,018 stars and recorded them in a special table. This scientific work became known as "Zij-i Sultani." In it, the length of the year was calculated as 365 days, 6 hours, 10 minutes, and 8 seconds-remarkably close to modern astronomical calculations.

Prominent scholars worked alongside Ulugbek, including Qazizoda Rumi, Ghiyath al-Din Jamshid al-Kashi, and Ali Qushchi. This scientific school later influenced the development of European astronomy. Ulugbek's star catalog was published in Europe in the 16th–17th centuries and served as a key reference for a long time. Even until the time of Tycho Brahe, these data were considered among the most accurate.

In addition to science, Ulugbek promoted education. The Ulugbek madrasa in Registan Square in Samarkand became a major center of learning. Mathematics, astronomy, logic, and philosophy were taught there in depth. He holds a special place in history as a ruler who made science an essential part of state policy.

Unfortunately, political conflicts and internal struggles led to the tragic end of his life. He died in 1449. Nevertheless, his scientific legacy has endured for centuries. The remains of the Samarkand observatory are preserved today as a historical monument, representing an important stage in the history of world science.

Mirzo Ulugbek is one of the greatest representatives of medieval Eastern science. He occupies an important place in history as a ruler who successfully combined governance with scientific activity. His work demonstrates that scientific thinking and precise observation methods play a decisive role in societal development.

Ulugbek's astronomical observations were far ahead of his time. His star catalog and calculations of the length of the year were used as scientific references for several centuries. This confirms the reliability of his scientific methods. The scientific environment he created, including the observatory and madrasa, became a vivid example of the Eastern Renaissance. Dedication to science, pursuit of precision, and a systematic approach are the key features of his legacy. Ulugbek's life proves that political power and science can complement each other. If science becomes a priority in state policy, societal progress accelerates.

Studying Ulugbek's legacy in depth should be one of the key directions of modern educational policy. In higher education institutions, special attention should be given to his scientific methods in teaching astronomy and mathematics. Reconstructing the history of the Samarkand observatory using modern technologies, creating 3D models, and developing interactive platforms can increase young people's interest. The work "Zij-i Sultani" should be republished with modern scientific commentary and presented in digital formats. It is also advisable to introduce practical astronomical observation sessions in schools and universities and strengthen cooperation with observatories. Studying Ulugbek's experience and adapting it to modern conditions is of strategic importance for the development of science.

References:

1. Ansari, S. M. R. *Ulugh Beg // Encyclopaedia of Islam*. 2nd ed. - Leiden: Brill, 2002. - P. 808-809.
2. Dallal, A. *Islam, Science, and the Challenge of History*. - New Haven: Yale University Press, 2010. - P. 167-172.
3. King, D. A. *Astronomy in the Service of Islam*. - London: Routledge, 2015. - P. 211-220.



4. Morrison, R. G. Ulugh Beg // Encyclopaedia Iranica. - New York: Columbia University, 2007. - P. 123-126.

5. Subtelny, M. E. Timurids in Transition: Turko-Persian Politics and Acculturation in Medieval Iran. - Leiden: Brill, 2007. - P. 89-97.

