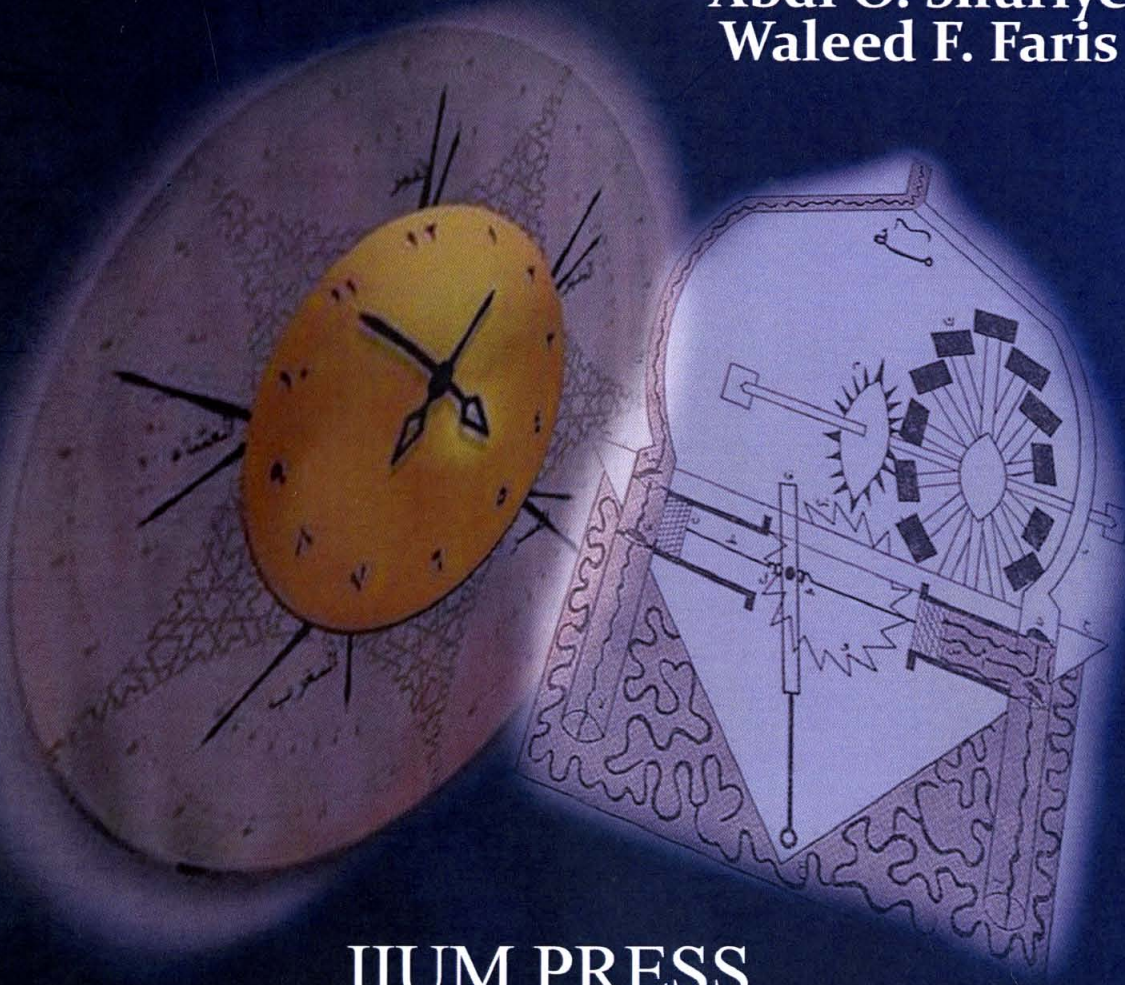


# Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

Abdi O. Shuriye  
Waleed F. Faris



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



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## **Editors**

Abdi O. Shuriye  
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## CHAPTER THIRTY ONE

### AL-JAZARI ON AUTOMATA

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#### 31.1 INTRODUCTION

This chapter investigates different spheres of work that Al-Jazari contributed in the field of automata. The objective of the chapter is to discover whether his contributions are truly novel and to seek whether his contributions cater around automata. Furthermore, this chapter looks into the information that has been provided by his book and whether this information provided is accurate enough to be defined under the domain of self-automation. The methodology used in developing this chapter relies on reliable sources. The significance of this chapter is to identify the contribution that Al-Jazari had made in automating his systems. Automata is a term which describes a self-operating machine. This refers to robots usually and specifically a self-operating robots also known as automated robots. Automata theory generally refers to automation of abstract machines. Abū al-'Iz Ibn Ismā'īl ibn al-Razāz al-Jazarī lived in the Islamic Golden Age. He is best known for his work entitled *The Book of Knowledge of Ingenious Mechanical Devices*. This book is a description of 50 different mechanical devices.

#### 31.2 HISTORY ON AUTOMATA

Automation was present before Islam. In Ctesibius of Egypt, the first musical automation was present. In Asia, Minor, Philon of Byzantium wrote the first major treatise of the ingenious devices. He happened to be a contemporary of the Ctesibius. Heron of Alexandria continued and extended that work (New Science, 2010).

Water clocks and other ingenious devices were further developed under Islam. These clocks were installed in the Islamic cities. One citation of this can be observed is the presentation of the clock from Harun al-Rashid to Charlemagne in 807 AD. And another citation was the obsession of moving machines by the Abbasid Caliph Al-Mutawakkil. His obsessions were so immense that he favored the Banu Musa (who were great engineers of that time) that he favored their book *al-Hiyal* during his period. (Al-Hassan, n.d.)

In this book of his, Al-Jazari has explained the concepts needed to build the mechanisms in simple Arabic that can allow a skilled craftsman to re-build a system relying on this book alone. Regarding this book Hill (2008, pp. 593-595) concludes also that “until modern times there is no other document, from any cultural area, that provides a comparable wealth of instructions for the design, manufacture and assembly of machines”