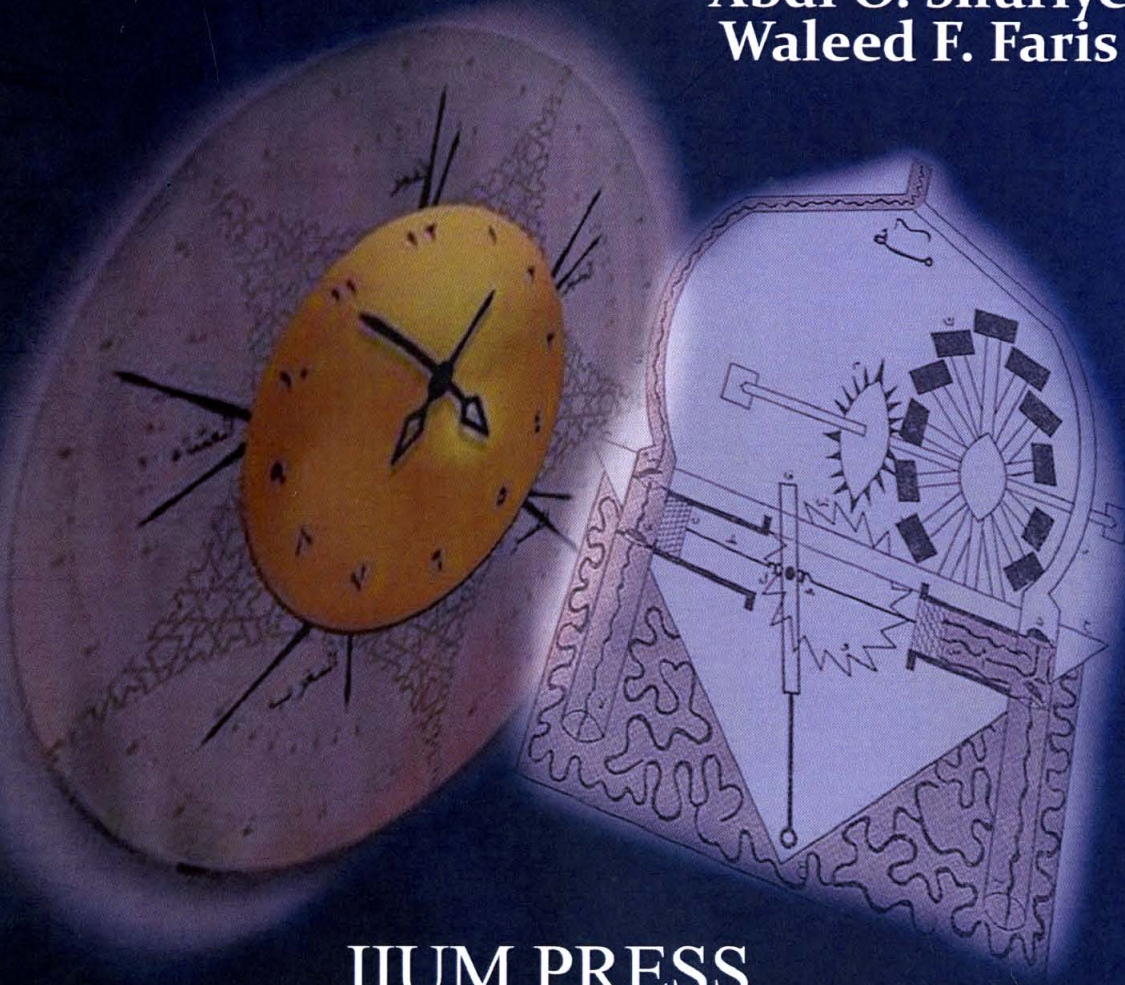


Contributions of Early Muslim Scientists to Engineering Studies and Related Sciences

Abdi O. Shuriye
Waleed F. Faris



IIUM PRESS
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



Contributions of Early Muslim Scientists to Engineering Sciences and Related Studies

Editors

Abdi O. Shuriye
Waleed F. Faris



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Abdi O. Shuriye & Waleed F. Faris : Contributions of Early Muslim Scientists to Engineering Sciences and Related Studies

ISBN: 978-967-418-157-4

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN.BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan
Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

Contents

<u>TITLE</u>	
Preface	v
Acknowledgment	vi
Lists of Contributors	vii
Introduction	1
Chapter 1 Al-Battani's Contribution to Astronomy	3
Chapter 2 Safiha by Al-Zarqali	8
Chapter 3 Ibn Al Shatir's Influence on Modern Astronomy	12
Chapter 4 I-Zarqali on Instrumentation	19
Chapter 5 Contributions of Al-Razi on Alchemy in Terms of Metal and Substance	24
Chapter 6 Jabir Ibn Hayyan's Work on Sulphur-Mercury Theory	30
Chapter 7 The Contribution of Hassan Al-Rammah to Gunpowder and Rocket Technology	36
Chapter 8 The Contribution of Ibn Al-Awwam in Botany and Agriculture	41
Chapter 9 Al-Battani Contributions in Astronomy and Mathematics	45
Chapter 10 Al-Biruni's Views on the Discovery of the Spherical Earth	49
Chapter 11 Al-Kashi and Access to the Arithmetic & Astronomy	53
Chapter 12 Nasir Al-Din Al-Tusi's Understanding of Trigonometry	58
Chapter 13 Al-Biruni's Experimental Scientific Methods in Mechanics	65
Chapter 14 Al-Haytham's Understanding of Physical Nature of Light	70
Chapter 15 Contributions of Ibn Al-Haytham on Optics	74
Chapter 16 Energy Particle-Physics: The Efforts of Abdel Nasser Tawfik	80
Chapter 17 Mahmoud Hessaby's Contribution to the Infinitely Extended Particles Theory in Quantum Physics	86
Chapter 18 The Contribution of Ibn Ishaq Al-Kindi to Light, Optics and Cryptology	91
Chapter 19 The Contribution of Ibn Sahl in Refraction of Light	95
Chapter 20 Al Kindi on Pharmacology	103
Chapter 21 Contributions of Kerim Kerimov in Aerospace Engineering	110
Chapter 22 Fazlur Rahman Khan's Understanding of Tube Structural System of Skyscrapers	115

Chapter 23	Contribution of Lofti Asker Zadeh to Fuzzy Logic	121
Chapter 24	The Nano World of Munir Nahfey	127
Chapter 25	Abbas Ibn Firnas's Contribution in Aviation	135
Chapter 26	Al- Jazari Contribution to the Development of Water Supply System	139
Chapter 27	Contribution of Tipu Sultan to Rocket Technology	143
Chapter 28	The Contributions of Al - Khazini in the Development of Hydrostatic Balance and its Functionality	147
Chapter 29	The Contribution of Banu Musa Brothers in the Self Changing Fountain	155
Chapter 30	The Invention of the Helium-Neon Gas Laser by Ali Javan	160
Chapter 31	Al-Jazari on Automata	165

CHAPTER TWENTY FOUR

THE NANO WORLD OF MUNIR NAHFEY

Nazmus Saquib, Waleed F. Faris

Fac. of Eng., International Islamic Univ. Malaysia (IIUM), Jalan Gombak, 53100 Kuala Lumpur, Malaysia.

24.1 INTRODUCTION

In the history of science and Technology, Islamic science refers to the science developed under Islamic civilization which is mostly known as Arab Civilization between the 8th and 16th centuries, during what is known as the Golden Era of Islam. This science and the achievements are called Arabic Science because most of those were written in Arabic language as Lingua Franca of that time especially in Muslim owned Civilizations.

A number of modern Scientists and philosophers as like Fielding H Garrison, Abdus Salam, Munir Nayfeh think that modern science also contributed by Muslim Scientists. Here they are giving their effort to introduce a modern empirical, experimental and quantitative approach to scientific investigation. Abdus Salam and George Saliba like to call this, Muslim Scientific Revolution. As like other Present Muslims Scientist, Munir Nayfeh is mostly known for his tremendous success in Nano-Technology especially in Nano- Silicon making procedures. Silicon Switch, Silicon Multi-photon separation and Isotope separation are his main contribution to the Modern Science. Besides that, he has more than 11 patents and 15 patents are waiting to be established.

Nahfey born in Palestine in 1945, he was awarded his Bachelor Degree and Masters Degree at the American University of Beirut and his did PhD in physics at Stanford University in 1974. Palestinian-American physicist Munir H. Nayfeh has created an innovative sphere of silicon nanoparticles. These nanoparticles are creating the platform for various applications such as cancer treatment and diabetes monitoring to increasing the lumens of Bulb and Efficiency of Solar Panel. He Won more than 100 Industrial Research (IR) Prizes and has more than 150 journal papers about his concrete research. He authored and edited four significant books in Electricity, Magnetic and Laser. Currently, he is working as Professor of Physics at the University of Illinois - Urbana-Champaign. He is also the founder President of NanoSi Advanced Technology Inc.

The objective of this chapter is to find out the achievement of Munir Nayfeh in Particle Physics as well as in Nanotechnology. The significance of this chapter proves Nayfeh as one of the pioneers of this field and his contribution has taken the world in to another sphere of Nanotechnology. The methodology has been taken in this chapter are from Internet information, Scientific journals and books.

24.2 NANO-PARTICLES HIS FIELD OF CONTRIBUTION

24.2.1 Nano-Particle

According to PAS71 document developed in the UK, the definition of nanoparticles is A particle having one or more dimensions of the order of 100nm or less". There is a note connected with this definition which is, Novel properties that differentiate