

# History of Persian Scientists and Poets: 28 Centuries of Contributions \*

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<http://www.wacong.org/persiansciencehistory>

(active - can download slides)

\* This lecture is dedicated jointly in memory of Professor Faz Reza, Prof. Maryam Mirzakhani, and Prof. Lotfi Zadeh





**M. Mo Jamshidi, Ph.D., DEgr. (h.c.)** is an Endowed Chaired Professor at the University of Texas, San Antonio, Texas, USA. He is a Persian native, born in Shiraz, Iran in 1944. He was an advisor to NASA for 10 years (including with first MARS Mission and 7 years with NASA Headquarters (Washington, DC), among other organizations. He has over 800 technical publications including 74 books in English and 5 foreign languages. For the past 15 years, he has been collecting data on Persian Scientists and Poets from 1000 BC to 2021 AD.

Persia (Greek word for Pars) and modern day Iran has at least 3000 years of civilization. Iran has been the new name since 1935. Throughout these years, thousands of scientists and poets have nourished in this land. Science and poetry has always been the lifeblood of Iranians. The object of this book is to give a brief history of scientists and poets of Persia who have paved the way to the modern age. With such a long history, it is impossible to have a complete coverage of all of them.



Figure 1. Ferdowsi's poem: "I have struggled much these thirty years .....in order to revise Persian and Parsi language."



Figure 2. Astrolabe is an elaborate inclinometer capable of working out several kinds of problems in astronomy, first described by Khwarizmi.



Figure 3. The four volumes of Avicenna's Canon of Medicine, used in Medieval Europe for 6 centuries.

JAMSHIDI

History of Persian Scientists and Poets

# History of Persian Scientists and Poets:

28 CENTURIES OF CONTRIBUTIONS

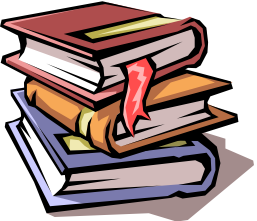


Mo Jamshidi



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# OUTLINE

- - 1. Goal and Project Plan**
  - 2. Science in Persia** (Khwarizmi, Raazi,, Biruni, Bou Ali Sina, Khayyam, Tusi)
  - 3. Poets of Iran** (Ferdowsi, Rumi, Saadi, and Hafez)
  - 4. Recent Scientists, Engineers** (Reza, Javan. Rezakhani and Zadeh, et al)
  - 5. Summary of Key Impacts**
  - 6. Final Remarks**





## Book Project Goal

Goal is to create a historical and factual account of who were and what the Persian / Iranian citizens (Azaris, Baluchis, Elamites, Gilanese, Kurdish, Meads, Persian, Turks, Partians, et. al.) **scientists** and **poets** have achieved for the past 28 centuries and how their work have impacted the world civilization at large.



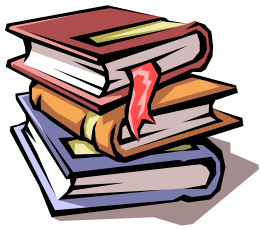


# Book Project Plan

This project is unavoidably tied with the History of Persia and now Iran and throughout the years, in spite of political problems and invasions, Iran, like only a few nations in the world, have always kept their identities and they do not celebrate an *“independence day”*.







# List of Individuals

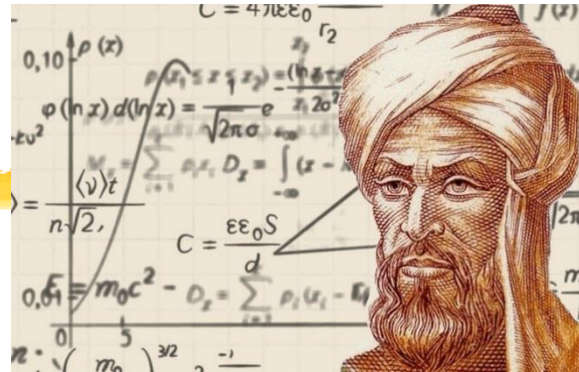
(Tonight's lecture)

1. **Zardousht**
2. **Cyrus the Great**
3. **Scientists:** 16 Chapters + 15 Perspectives : Borzuya, Khwarizmi, Raazi, Biruni , Bou Ali Sina, Khayyam, Tusi, ..., Hashtroodi, Hesabi, Javan, Reza, Zadeh, Mirzakhani, Birkar, Jadbabei, et. al.
4. **Poets:** 17 Chapters + 20 Perspectives: Rudaki, Daqiqi, Ferdowsi, Khayyam, Moulana Rumi, Saadi, Hafez, Khaghani, Nezami Ganjavi, Sanai, Ghazali, Ubaid Zakani, Jaami, .... , Farukhi Sistani, Iraj Mirza, Dekhoda, M S Bahar, Etesami, Nima Yooshij, Behbehani, Tavallali, Shamlou, et al. (Two painters: Kamal din Behzad and Hossein Behzad)
5. **Special Group:** 4 **Patriot Ministers** Bozorgmehr (To King Kavard I of Sassanid Dynasty), Nezam Ol Molk (20 years Minister during the Seljuk dynasty), Amir Kabir (2 years minster of Naser-din Shah of Gajar Dynasty), and Mosaddegh (2 years minster of Pahlavi Dynasty)



# Renowned Scientists of Persia

## Khwarizmi



**Khwarizmi** was a legendary Persian scientist of 8<sup>th</sup> and 9<sup>th</sup> Centuries who created the field of algebra in mathematics and created the notion of recursive computing – Algorithm.

Khaweazmi	Mohammad Khawrazmi
Born	780 AD
Place of Birth	Khwarazm (now Khiva), in greater Khorasan province of Persia (now in Uzbekistan).
Nationality	Persian (Iranian)
Death	850 AD (70 years)
Place of Death	Baghdad, Abbasid Dynasty Capital
Parents	Unknown
Religion	Indication is that as a youth he was a Zoroastrian and converted to Islam later on
Married	Unknown





# Renowned Scientists of Ancient Persia





# Renowned Scientists of Ancient Persia Khwarizmi



## Contributions and Achievements

**Algebra** - *al-Kitāb al-mukhtaṣar fī hisāb al-jabr wal-muqābala* translated as *Compendious Book on Calculation by Completion and Balancing*.

The 0-9 decimal system devised by Khwarizmi after he learned the concept of “zero” from Hindu mathematicians.

Pre-zero time, he used Geometry to solve algebraic Equation  $ax^2 + bx + c = 0$

one angle 	two angles 	three angles 
four angles 	five angles 	six angles 
seven angles 	eight angles 	nine angles 
	no angle 	

(sifr, which gave the French word "chiffre")



# Renowned Scientists of Ancient Persia

## Khwarizmi



**Summary** – Khwarizmi is one of the most consequential scientist, mathematician, and astronomer in our 21<sup>st</sup> Century civilization. He is credited with the following lasting contributions:

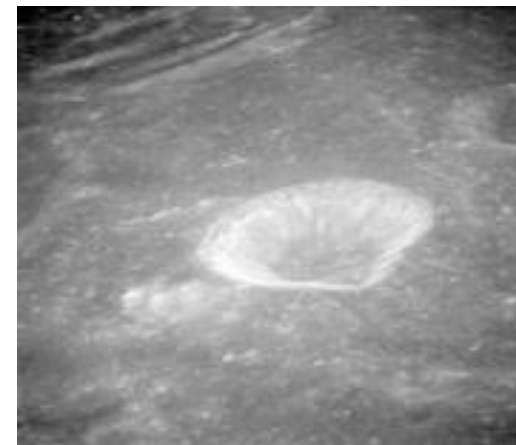
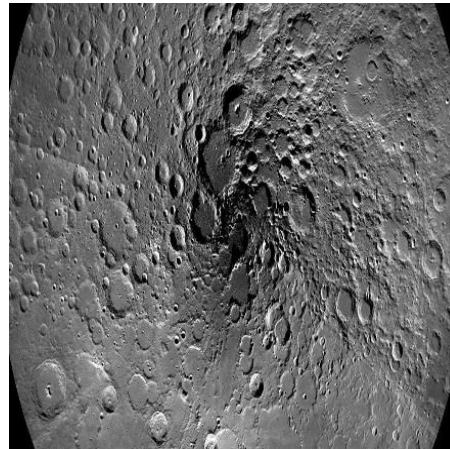
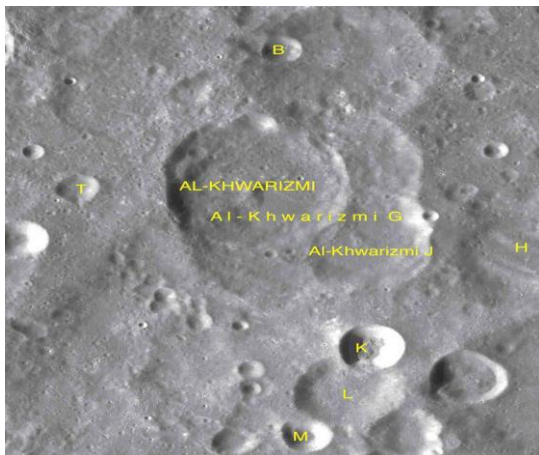
**Algebra:** He was the first who created branches in mathematics. He is the “Father of Algebra”.

**Algorithm:** He invented the notion of algorithm in computing. Some consider him as the “Forefather of computer science”.

**Digit Zero “0”** : He used the Hinus’ work on a dot later he called zero number and developed the (0-9) decimal counting system impacting arithmetic all the way to our current 21<sup>st</sup> Century.

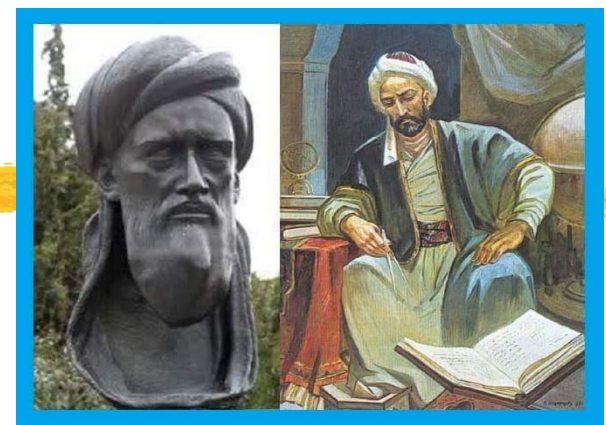
**World Map and Calendar:** He made lasting impacts to trigonometry, astronomy, geography, calendars, etc.

**Final Points:** NASA – Space agency of United States has dedicated a North Moon Crater in honor of Khwarizmi [https://en.wikipedia.org/wiki/Al-Khwarizmi\\_\(crater\)](https://en.wikipedia.org/wiki/Al-Khwarizmi_(crater))



# Renowned Physicians of Ancient Iran

## Razi - Rhazes



<b>Rhazes</b>	<b>AKA Zakaria Razi</b>
<b>Born</b>	854 AD
<b>Place of Birth</b>	Rayy, Persia (Today's suburb of Tehran, Iran)
<b>Nationality</b>	Persian (Iranian)
<b>Death</b>	October 15, 925 (71 years)
<b>Place of Death</b>	Rayy, Persia (Today's suburb of Tehran, Iran)
<b>Parents</b>	Zakariya ibn Yahya
<b>Married</b>	Married





# Ferdowsi Iran's Epic Poet – Savior of the Persian Language



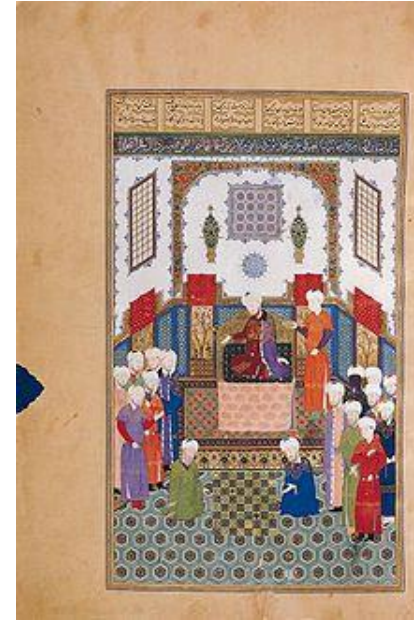
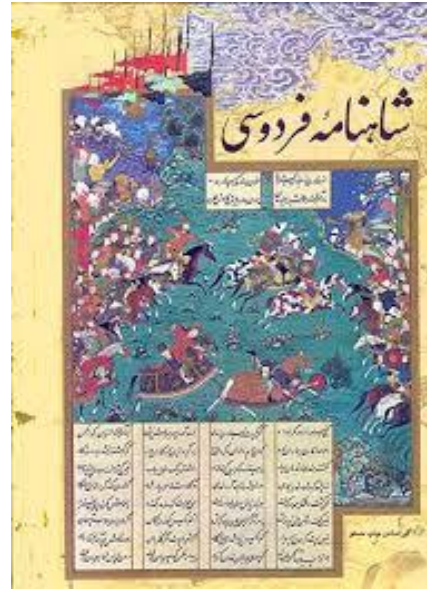
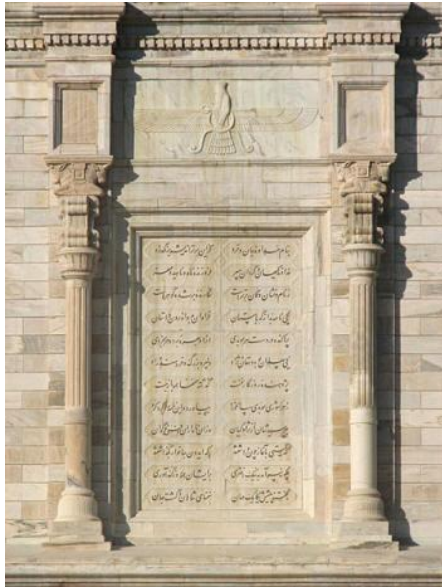
**Ferdowsi** is perhaps the greatest of all Persian epic poets as he was responsible in revival of the Persian language in spite of the foreign languages and cultures of invaders of the Persian lands of those days and eras. His epic book *Shahnameh*, called “*Book of the King*”, was written during the 10<sup>th</sup> Century. It took him 30 years to finish the book.

<b>Born</b>	940 AD
<b>Place of Birth</b>	Tus, Khorasan, Persia (In today's Iran), old name: Pirouz Parsi
<b>Nationality</b>	Persian (Iranian)
<b>Death</b>	1020 AD
<b>Place of Death</b>	Tus, Persia (In today's Iran)
<b>Parents</b>	Father: Baha ud-Din Walad, himself a mystic and theologian known as sultan of scholars



# Ferdowsi Iran's Epic Poet – Savior of the Persian Language

The *Shahnameh*, also transliterated as *Shahnama* (Persian: "The Book of Kings"), is a long epic poem is the national epic of Greater Iran. Consisting of some 50,000 "distichs" or couplets (two-line verses), the *Shahnameh* is the world's longest epic poem written by a single poet. It tells mainly the mythical and to some extent the historical past of the Persian Empire from the creation of the world until the Islamic conquest of Persia in the 7th century. Modern Iran, Tajikistan, Azerbaijan, Afghanistan, and the greater region influenced by the Persian culture (such as Georgia, Armenia, Turkey and Dagestan) celebrate this national epic



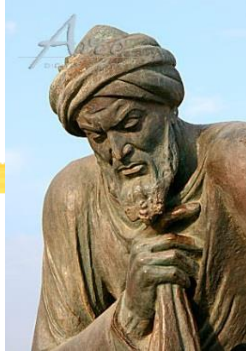
"I have struggled much these thirty years  
\*\*\* in order to revive Persia 'ajam' and Parsi  
language

بیست و سه سال در این سال می  
عجم زنده کردم بدین پارسی



# Renowned Scientists of Ancient Persia

## Abu-Reyhan Biruni



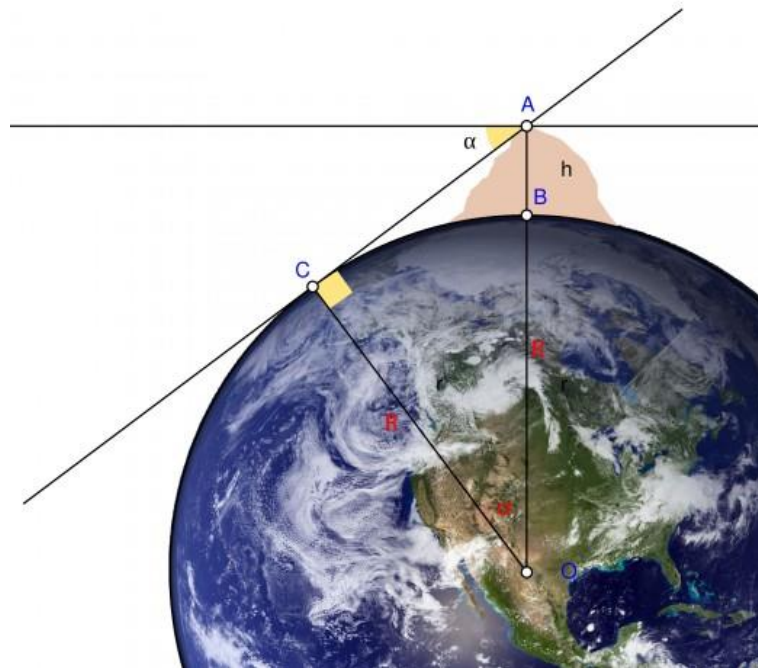
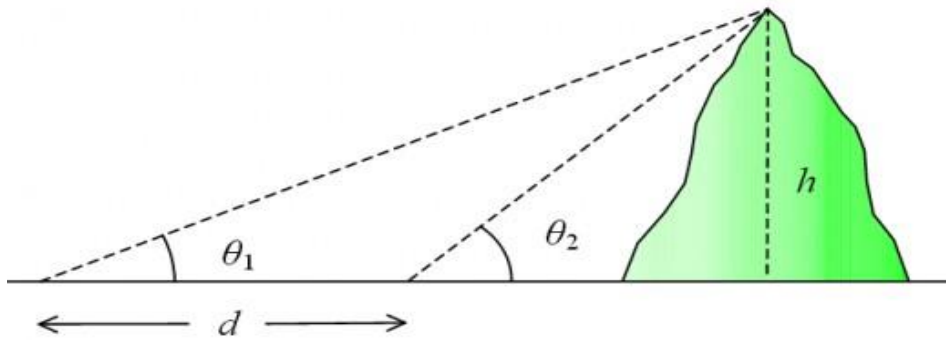
**Biruni** was a versatile genius scholar and scientist who had equal facility in physics, metaphysics, mathematics, geography and history.

Rhazes	Abu-Reyhan Biruni
<b>Born</b>	15 September 973
<b>Place of Birth</b>	Kath (now called Biruni), Khwarazm or Greater Khorasan, Persia (now Kara-Kalpakskaya, Uzbekistan)
<b>Nationality</b>	Persian (Iranian)
<b>Death</b>	13 December 1048
<b>Place of Death</b>	Ghazna, Khorasan Province, Persia (now Ghazni, Afghanistan)
<b>Parents</b>	Unknown
<b>Married</b>	Married





# Biruni's Estimation of Earth's Radius



⌘ **Biruni** 1000 years ago used an instrument called Astrolabe to measure angles of a mountain summit and sun's horizon, leading to a 1% accurate estimation of Earth's radius.



# Renowned Physicians of Ancient Iran

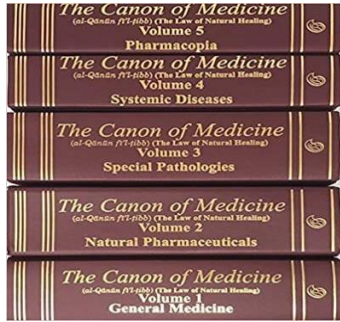
## Pour Sina **Avicenna**



<b>Avicenna</b>	<b>AKA Bou Ali Sina, Sheikh-Al-Rayeese</b>
<b>Born</b>	August, 980 AD
<b>Place of Birth</b>	Village of Afshana, near Bukhara, Greater Khorasan, Persia (Today's Uzbekistan)
<b>Nationality</b>	Persian (Iranian)
<b>Death</b>	June 1037 (57 years)
<b>Place of Death</b>	Hamadan, Persia (Today Iran)
<b>Parents</b>	Father: Abdullah, Mother: Setareh
<b>Married</b>	Never married



# Renowned Physicians of Ancient Iran



من آنقدر بزرگ شدم که هیچ شهری نتوانست نگاه دارد مرا  
ولی قیمتم آنقدر بالا رفت که هر خریدار مرا فروخت ❀

❀ **Famous quote:** “I grew so big that no city could hold me,  
But my price went so high that every buyer sold me.”

## *Content of Cannon of Medicine*

Part 1: Nature of the human body, anatomy, physiology and definition of various diseases.

Part 2: This part deals with simple treatments of many illnesses.

Part 3: The pathology of 21 human organs constituted the third part.

Part 4: Symptoms and diagnostics of various diseases are presented in the fourth part of *The Cannon*.

The fifth and final part is dedicated to drugs and medicines and pharmacopeia - a manual to help prepare compound medicines.

Known as **“A man of every 1000 years”**

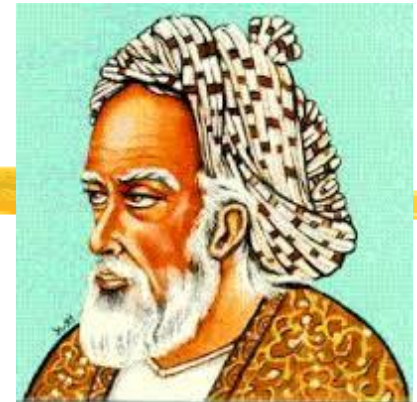




# Renowned Scientists of Persia **Khayyam**



Умары Хайём - Омар Khayyam

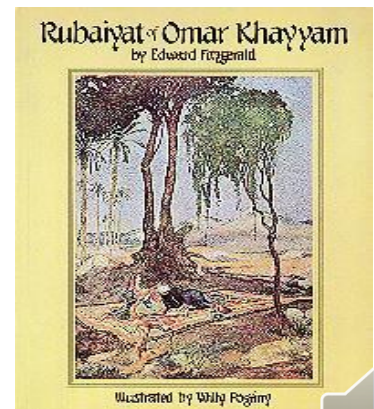


**Omar Khayyam** is a genius Persian scientist who was a mathematician, an astronomer, an astrologer, a physician, and yes a poet of 11<sup>th</sup> and 12<sup>th</sup> Century

The west knows him mostly as a poet due to the 19<sup>th</sup> Century translation of Englishman Edward Fitzgerald (31 March 1809 – 14 June 1883) poetry works, known as *the Rubaiyat of Omar Khayyam*. His Scientific contributions have not been appreciated in the West.



Khayyam	Omar Khayyam, Keivan Neishbouri
Born	May 18, 1048 AD
Place of Birth	Nishabour, Persia (now in Khorasan province of Iran)
Nationality	Persian (Iranian)
Death	December 4, 1131 AD (83 years)
Place of Death	Nishabour, Persia (now in Khorasan province of Iran)
Parents	Father: Ibrahim
Married	Never Married



# Renowned Poets of Persia

## Moulana Rumi

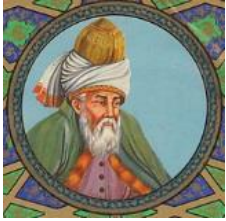


\* **Moulana Jalal-edin Balkhi (Molana Rumi)** of 13<sup>th</sup> Century AD is the greatest Sufi poet of all time.

\* He is one of the most famous poets of the Persian literature. At the age of 12, his father (Bahar-ed-Din Weled) and rest of the family left Balkh to avoid the curse of the Mongol invasion who were coming fast from the East Asia. After several years on the road (Mecca, Medina, and Damascus), the family resided in Konya close to the Anatolian peninsula (now in Turkey). "Anatolian peninsula, at the time, belonged to Byzantine, or Eastern Roman Empire.

He published two seminal books of poetry called *Matnavi or Matnawīye* and *Diwan aod Shams*. His poems, often full of advice for the global community. He has millions of followers across the globe due to his spiritual vision to humanity and eternity.





# Moulana Rumi – The masterpiece Mathnawi



- Mathnawi's gazals were recited by Rumi and Chelebi wrote each segment and Rumi got to proof the writings later on. The masterpiece begins with this verse:

- بشنو از نی چون حکایت میکند
- از جدایی ها شکایت میکند

- *Listen to the reed and the tale it tells, how it sings of separation*
- In Mathnawi, over 800 years ago Rumi addressed discoveries such as gravity, quantum physics, nuclear physics, dielectrics, philosophy, astronomy and many other scientific facts
- Re **Sunlight, Spinning Galaxies and Forces of Gravity:**

آسمان گوید زمین را مرحبا  
باتوام چون آهن و آهن ربا

*“The sky hails the Earth \*\*\* I am with you as the iron is with the magnet”*

این چراغ شمس کو روشن بود  
نه از فتیل و پنبه و روغن بود  
سقف گردون کو چنین دایم بود  
نه از طناب و استنی قایم بود

*“The burning light of the sun Is not from burning oil and the wick  
Our spinning galaxy, which is so continuous Is not constructed on columns and fastened by wires.”*

In 1687 Isaac Newton discovered the gravitational forces by observing an apple falling from a tree. Over 450 years earlier, Rumi recited the above verses.

Naini, 2001







# Moulana Rumi - Samaa

- Rumi in his celebrated masterpiece *Mathnavi* book (starting with verse 4580) predicted **nuclear explosion**:

- آفتابی در یکی ذره نهان
- ناگهان آن ذره بگشاید دهان
- ذره ذره گردد افلاک و زمین
- پیش آن خورشید چو جست از کمین

*“Inside of each particle is a hidden sun*

*Suddenly that particle opens its mouth*

*The galaxies and the Earth become shattered  
hiding”*

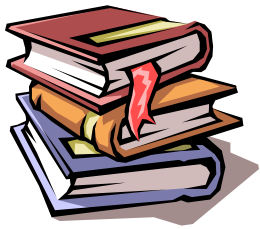
*In front of that sun when it comes out of*

Or in verse 2502

اینست خورشیدی نهان در ذره  
شیر نر در پوستین پره

*“There is a sun hidden in a particle The male lion in lamb’s clothing” Naini, 2002*





# Saadi Shirazi



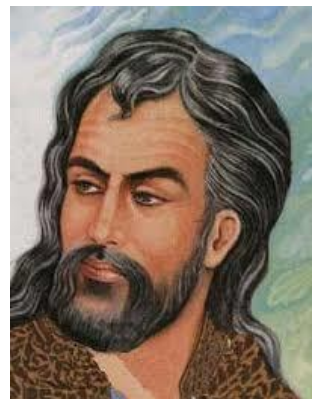
## In Persian:

بنی آدم اعضای یکدیگرند  
که در آفرینش ز یک گوهرند  
چو عضوی به درد آورد روزگار  
دگر عضوها را نماند قرار  
تو کز محنت دیگران بی غمی  
نشاید که نامت نهند آدم

## A simpler translation:

“The sons of Adam are limbs of each other,  
Having been created of one essence.  
When the calamity of time affects one limb  
The other limbs cannot remain at rest.  
If you have no sympathy for the troubles of others,  
You are unworthy to be called by the name of a human.”





## Renowned Poets of Persia **Hafez Shiraz**

اگر آن ترك شیرازی به دست آرد دل مارا

به خال هندویش بخشم سمرقند و بخارا را

That beautiful Shirazi Turk, took control and my heart stole,  
I'll give Samarkand & Bukhara, for her Hindu beauty mole



Tomb of Hafez– Shiraz Hafez 1315 – 1390



# RECENT Scientists



- **Fazlollah Reza** is a pioneer in information theory, electric circuits and an authority on Persian Poetry, specially with respect to the life and works of Persian Epic Poet **Abolghasem Ferdowsi**.

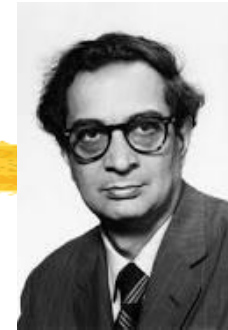
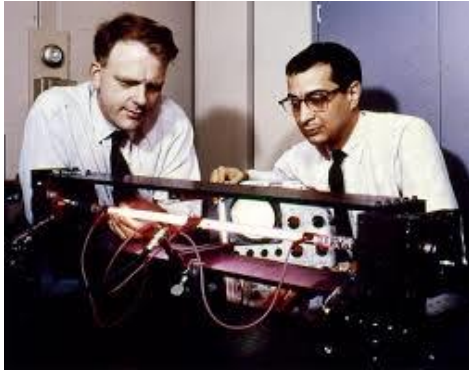
- **Fazlollah Reza** was born on January 1, 1915 in Rasht, Iran (Passed away Nov 19, 2019 -*104 years*). He received his Bachelor's degree in Electrical Engineering from the University of Tehran in 1938. He was the 1<sup>st</sup> electrical engineering student at the Univ. of Tehran and all of Iran then.

He received his MS degree in electrical engineering from Columbia University in 1946 and Doctor of Electrical Engineering from Polytechnic University of New York in 1950.





# Javan Iranian Physicist who co-invented HeNe Gas Laser



Javan, a genius Persian physicist of 20<sup>th</sup> and 21<sup>st</sup> Centuries co-inventor of HeNe Gas Laser in 1960. His main contributions to science have been in the fields of quantum physics and spectroscopy. In 2007, Javan ranked number 12 on *The Daily Telegraph's* list of the "Top 100 Living Geniuses". He was number 12 on the list, in the company of such notables like Nelson Mandela, Steven Hawkin, Steven Spielberg, Bill Gates, Richard Bronson, Steve Wozniak and George Lucas.

<b>Javan</b>	<b>Ali Javan, Inventor of "He-Ne laser"</b>
<b>Born</b>	December 26, 1926 AD
<b>Place of Birth</b>	Tehran, Iran
<b>Nationality</b>	Azari, Persian, American
<b>Death</b>	September 12, 2016 AD
<b>Place of Death</b>	Los Angeles, CA, USA
<b>Family</b>	Wife Marjorie, and two daughters, Lila and Maia.
<b>Interest</b>	Art, Music (especially Mozart), Museum, the outdoors, fine food, and more.
<b>Genius</b>	He was number 12 on <u>the Daily Telegraphs</u> Newspaper, 100 living Geniuses of 20 <sup>th</sup> Century





Mirzakhani	
Born	May 3, 1977
Place of Birth	Tehran, Iran
Nationality	Persian (Iranian)
Death	July 14, 2017 (40 years)
Place of Death	Stanford, CA, USA
Married	Married to Jan Vondrák
Daughter	Anahita

- Mirzakhani was born on 3 May 1977 in Tehran, Iran. Her father Ahmad is an electrical engineer. She attended Tehran Farzanegan School there, part of the National Organization for Development of Exceptional Talents (NODET). In 1994, Mirzakhani achieved the gold medal level in the International Mathematical Olympiad, the first female Iranian student to do so. In the 1995 International Mathematical Olympiad, she became the first Iranian student to achieve a perfect score and to win two gold medals.

She obtained her BSc in mathematics in 1999 from the Sharif University of Technology. She then went to the United States for graduate work, earning her Ph.D. in 2004 from Harvard University, where she worked under the supervision of the Fields Medalist Curtis T. McMullen. At Harvard she is said to have been "distinguished by determination and relentless questioning", despite not being a native English-speaker. She used to take her class notes in Persian.

Wikipedia.org



# RECENT Notable Scientists

## “Father of Fuzzy Logic”



**Lotfi Asker Zadeh** (born February 4, 1921 in Baku, Azerbaijan (USSR).

He passed away on September 6, 2017 in Berkeley, CA, USA, age 96 years old) was an electrical engineer, a mathematician and computer scientist, and a professor of computer science at the University of California at Berkeley.

He was born in as **Lotfi Aliaskerzadeh** (or **Askar Zadeh**), to a Russian mother and Azeri father of Iranian origin (Ardebil), grew up in Iran, studied at Alborz High School and Tehran University, and moved to the United States in He taught at Berkeley since 1959. He published his seminal work on fuzzy sets in 1965 in which he detailed the mathematics of fuzzy set theory.

- In 1973 he proposed his theory of fuzzy logic.

Currently he has 244,350 Scholar Google Citations.







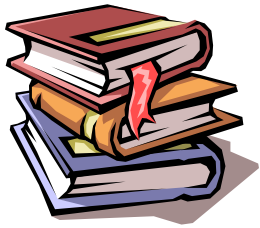
# Lotfi Zadeh

• Lotfi's credentials is immense -- ~ 30 honorary doctoral degrees, Fellow and member of numerous academies and societies, Russian Academy of Natural Sciences, Member National Academy of Engineering, Medal of Honor of the IEEE (highest IEEE medal ), over 30,000 patents have been issues in US alone, etc. He loved women.



• His charming, sacrificing and patient wife Fay was one of keys to his success. In 1998 she wrote a book, entitled, *“My Life and Travels with the Father of Fuzzy Logic,”* TSI Press, Translated into Russian and Azari in Baku. In that Book she expressed all the wonderful and some not so wonderful events during her time with Lotfi. They Were married for 72 years.





# Thank You

**I hope I can live long enough to realize  
this dream that I have had since the age  
of 14 years old !!**

**Currently English version is moving on  
fast, simultaneous translations in Parsi,  
Arabic and Russian are under way.**

# فصل 1 زرتشت (پیامبر)





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Chapter 2 Cyrus the Great ((Founder of Persia's 1<sup>st</sup> Dynasty)

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Chapter 21 (Naseer Tusi)

Chapter 22 Moulana Rumi (Legendry Persian Sufi Poet)

Chapter 23 Saadi (Poet)

Chapter 24 Ubaid Zakani (Satirist Poet)

Chapter 25 Hafez (Shirazi Poet)

Chapter 26 Ulugh Beg (Scientist, Sultan)

Chapter 27 Jaami (Poet)

Chapter 28 Sheikh-Bahaei (Scientist)

Chapter 29 Mullah-Sadra (Philosopher)

Chapter 30 Hashtroodi (Mathematician)

Chapter 31 Hesabi (Scientist)

Chapter 32 Reza (Engineer and Literary Man)

Chapter 33 Zadeh (Engineer and Computer Scientist, Innovator)

Chapter 34 Javan (Physicist and Inventor of He-Ne Laser)

Chapter 35 Mirzakhani (Mathematician)

## **ACADEMY MEMBERS**

NAE, NAS, TWAS

## **PERSPECTIVES**

### **Bozorgmehr (Nobel Minister)**

Farrukhi Sistani (Poet)

### **Nezam-Ol-Molk (Educator and Minister)**

Behzad, Kamal-Ol-Molk (Painter)

Sabzevari (Scientist)

### **Amir Kabir (Visionary Minister, Patriot)**

Iraj Mirza (Poet)

Dehkhoda (Linguist, Patriot)

### **Mossadegh (Minister, Patriot)**

Malek-O-Shoarah Bahar (Poet)

Behzad, Hossein (Painter)

Nima Yooshij (Poet)

Hedayat (Writer)

Hatef Esfehani (Poet)

Shahriar (Poet)

Etesami (Poet)

Rahi-Moayeri (Poet)

Mosaheb (Mathematician) Tavallali (Poet)

Yarshatar (Historian and Linguist)

Moeini Kermanshahi (Poet)

Jalal-Al Ahmad (writer)



Shamlou (Poet)

Moshiri (Poet)

Naraghi (Poet)

Behbehani (Poet)

Sepehri (Poet)

Naderpour (Poet)

Farokhzad (Poet)

Khodadoost (Ophthalmologist, Surgeon)

Jadbabaei (Engineer, Educator, Pioneer)

Beyzai (Playwright, Film Editor)

Brumand (Nephrologist, Innovator, Patriot)

Rustami (Filmmaker, Producer, Painter, Poet)

Samandar (Contemporary Poet, Lyricist and Musician)

Lucas (Engineer, Educator)

Birkar (Mathematician Field Medalist)

Jalal e Al-Ahmad (Novelist, Philosopher)

Yarshatar (Historian, linguist, and Iranologist)