Innovation and Entrepreneurship from the Stone Tool to Artificial Intelligence

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By

Yosef Bonaparte

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PREFACE

Yosef Bonaparte is a Professor in Finance at the *Business School* of the *University of Colorado in Denver,* and the Director for External Affairs in Finance and the Director of Masters in FinTech. He has a PhD in economics from the University of Texas and has taught in several institutions and universities in the United States and Canada. He is currently an Associate Professor of Finance at the University of Colorado in Denver. His research has focused on **household finance**, asset pricing, demographic and racial finance, and political finance. Specifically, Professor Bonaparte analyzes how political climate and political affiliation influence a household's key financial decisions, such as, the level of risk tolerance and participation in the stock market.

Professor Bonaparte has been active in research in macroeconomic and monetary policy and published several articles in this field. Recently, Professor Bonaparte has focused on recent technological developments and their impact on humanity in general and finance in specific. He has published four books about cryptocurrency and blockchain, ESG investing and the Black portfolio from slavery to the pursuit of happiness. In addition, he has published several articles about cryptocurrency, blockchain and artificial intelligence in top rated journals.

In fact, Professor Bonaparte is the only person who has quantified what is called transitory inflation that was first introduced by the Federal Reserve Chairman Jowell Powel. Moreover, Professor Bonaparte has recently researched the impact of monetary policies on household decisions, especially, the decision to participate in the stock market. Professor Bonaparte has published articles in top finance and economics journals, including the *Journal of the Financial Market*, and a magazine about monetary policy and the impact of federal reserve seniority on the financial market. In his article in the *Journal of Monetary Economics,* Bonaparte analyzes the sensitivity to the interest rate of households' saving-consumption decisions.

Professor Bonaparte won the University of Colorado in Denver DEI award for shifting focus to address the emerging crisis of pandemic research and

creative activities in 2021. In addition, he was a public speaker for several events, to support equality, diversity and financial inclusion. One of these events was a workshop with Charles Schwab to fight financial literacy, during the summer of 2022.

Finally, Professor Bonaparte's research has been published in top finance and economics journals, and his work has been featured in major newspapers and magazines, including the *New York Times, Wall Street Journal, Market Watch*, *Denver Post*, Yahoo finance and MSN, and he has been featured on several TV networks including ABC and Fox News.

INTRODUCTION AND MOTIVATION

What Motivated me to Write the Book?

Charles Darwin made a statement that changed my life and motivated me to write this book. Indeed, Darwin said that neither the most intelligent species nor the strongest, fastest or largest species survived, but the most adaptable species, which means the one that was most innovative, survived. This statement deserves a book because we observe that what goes on in species goes on in people, nations, and countries. Moreover, as a professor of finance, who prices companies based on the current and future cash flow, Darwin is the core and soul of cash flow pricing for companies, i.e., how the company is adaptable to new ecosystem, that will eventually impact its cash flow and prices.

The second reason for writing the book is the emerging artificial intelligence (AI) and blockchain technologies that are reshaping the entire world, especially the technology sector and hence the financial world, that is the center of the world. Indeed, humanity has passed through three main economic revolutions, the agricultural, industrial and recent tech revolution. All of these revolutions have to do with innovation and entrepreneurship. Therefore, we ought to learn how the world is changing and how innovation turns our physical Earth into a "digital twin," as noted by one of the best inventors and entrepreneurs, the owner and **CEO of Nvidia Jensen Huang**.

The third reason I am writing this book is the fall and rise of nations. Several empires have controlled large portions of the world, yet at some point these empires have disappeared. These nations still exist, but now they inhabit one or several countries. Most work has focused on the political stability reasons for these nations to fall, yet they have missed one of the key elements, which is the innovation part for the rise of nations. Take, for instance, the United States. It is a superpower country with a large arsenal of weapons, a large army and bases around the world and the most advanced air force; people may be confused in thinking that the US is the most powerful country in the world because of these "toys," but it is because of the innovation spirit of the American people. This US nation, i.e., the American people, has the innovative spirit that created the light bulb, computer, PC, internet, electrical cars, etc. The number of patents registered

in the US during the year 2022 is almost equal to the number of patents registered in the entire world combined.

I believe that for these three main reasons, I decided to dedicate my time and write this book. I also feel obligated to write this book given the lack of focus on innovation around the world, especially among non-affluent people and third world countries. I want to be the light at the end of the tunnel for these people and nations to rise; being innovative is the key formula for success.

BOOK OVERVIEW

The goal of this book is to highlight the importance of innovation and entrepreneurship to nations and people. Innovation is not for making things easier but for shifting power; when the nation is more innovative, the nation gains strategic power and hence the rise phase starts. Of course, inventors work and research because of their passion, career path and life excitement by exploiting their potentials, but the collective effort of all innovators in the nation causes a power shift. Universities in the nation provide the greatest educational inspiration for scholars and shift the talented brains to those areas with better university experience.

But first, let's define innovation and entrepreneurship and their relationship. Innovation and entrepreneurship are closely related concepts that are critical for economic growth and development. While innovation refers to creating and developing new ideas, products, and services, entrepreneurship brings these ideas to the market and creates a new venture.

The book encompasses three sections, and each section contains two chapters. Chapter 1 in section 1 focuses on innovation and entrepreneurship from the origin, covering the three economic revolutions, the agricultural, industrial and technological (the current) revolutions and focuses on the rise and fall of banks as an analogy for the impact of these revolutions. Chapter 2 in section 1 analyzes the fall and rise of nations and covers the historical background of several empires. The chapter also focuses on recent data relating to innovation across nations and countries as well as across states.

Section 2 of the book focuses on the most recent innovation, artificial intelligence and its financial impact on stocks and ETFs. Specifically, chapter 3 first defines and explains what is AI technology, as well as a subset of this technology, namely, machine learning, generative AI, etc. Chapter 4 presents analyses on how to valuate stocks based on AI exposure and presents two valuation methods, the fundamental and behavioral methods.

Section 3 focuses on the academic and classroom contexts; namely, the educational part of the book. Specifically, in chapter 5 we present research on the gender gap and its impact on women's entrepreneurship decisions and show that the greater the wage gap, the higher is the propensity for

women to become entrepreneurs. Chapter 6 presents a class in innovation and entrepreneurship from the economics and finance syllabus, and we also present survey results on students' views about innovation, fintech, AI and ChatGPT.

To sum up, the book reviews innovation and entrepreneurship from the origin till the present; we even use banks as an old industry and consider how innovation contributed to the fall and rise of nations. Indeed, humanity has passed through three economic revolutions and such a book has to document and analyze their impact on humanity and their economic and financial implications.

How May the Book Help You?

This book presents critical thinking topics with a secret recipe for what makes nations rise. We show how the marriage of innovation and entrepreneurship can be the most impactful tool to build a nation. We present some lessons from the nations that fall due to a lack of innovation and some examples of nations that rise because of that exact same reason. Therefore, the book can be an instrumental asset to aid policy makers, presidential governments, and representatives, for nation building or nation raising.

This is the only book that covers the three economic revolutions of mankind, and then focuses and zooms in on the current one, the technology revolution, namely, artificial intelligence, machine learning, generative AI, blockchain and the metaverse. We take the reader from mankind's first innovation, namely, the stone tool, to the most current AI and technology in general.

This is the first book that has suggested that innovation is the key for understanding the fall and rise of nations and this is the only book that presents rigorous analyses on how to price technology in the stock market. We call that subsection AI in finance. The book can be very useful for academic research, as one of the chapters focuses on women's entrepreneurship and its motive. We show that when the gender wage gap is wide, women prefer to become entrepreneurs than earn a lower wage than a male. We are excited to share that some of the chapter analyses have been published in a top economic and entrepreneur journal, that is ranked A in the ABDC Deans list.

This is also the only book that can be used for the academic classroom, as we suggest offering an innovation, entrepreneurship economics, finance and entrepreneur class that can be taught in the undergraduate and the graduate MBA programs. We provide the motivation for such a class with a survey that we conducted for this purpose, and we also provide the syllabus and slides that an instructor can use for the class.

We really believe that we are making a breakthrough in this book, by placing innovation as the key ingredient for success for households. corporations, governments, and nations. If you are an elected official, this

book can be great for you as one of the key policies is innovation and how to make your nation innovative and part of the new emerging “digital twin” world.

KEY QUOTES ABOUT INNOVATIONS

Here are some quotes about innovations by famous people:

- "Innovation is the ability to see change as an opportunity rather than a threat" – Steve Jobs
- "The true sign of intelligence is not knowledge but imagination" – Albert Einstein
- "Innovation is the art of seeing what everyone else has seen and thinking what no one else has thought" – Albert Szent-Gyorgyi
- "Innovation distinguishes between a leader and a follower" – Steve Jobs
- "The only way to do great work is to love what you do" – Steve Jobs
- "Innovation is not the product of the moment. It comes from the fusion of deep insights, curiosity, perseverance, and courage" – Tom Kelley
- "Innovation is the process of turning ideas into reality" – Peter Drucker
- "Innovation is the key to success in the 21st century" – Bill Gates
- "Innovation is about taking risks and not being afraid to fail" – Mark Zuckerberg

These quotes highlight the importance of innovation in today's world. Innovation is the key to success in business, and it is also essential for solving the world's most pressing problems. If we want to create a better future, we need to be open to new ideas and willing to take risks.

KEY QUOTES ABOUT ENTREPRENEURSHIPS

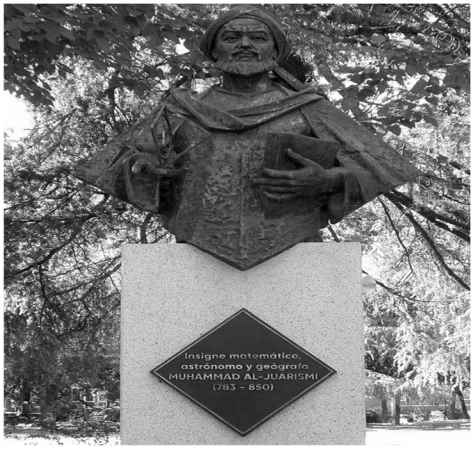
- “The only way to do great work is to love what you do” – Steve Jobs
- “Entrepreneurs are the only people who will tell you that the sky is not the limit, because they know there are footprints up there” – Paul Allen
- “The entrepreneur is essentially a visualizer and an opportunist. He sees things in the mind’s eye, before they actually exist” – Robert J. Ringer
- “The entrepreneur is the risk taker, the innovator, the creator of new wealth. He is the central figure in the drama of economic progress” – Joseph Schumpeter
- “Entrepreneurship is about turning ideas into action. It’s about taking risks and not being afraid to fail” – Mark Zuckerberg
- “Entrepreneurs are the ones who will change the world” – Bill Gates
- “Entrepreneurship is the engine of economic growth” – Michael Porter
- “Entrepreneurs are the dreamers who turn their dreams into reality” – Guy Kawasaki
- “Entrepreneurs are the pioneers of the future” – Naveen Jain

These quotes highlight the importance of entrepreneurship in society. Entrepreneurs are the ones who create new businesses, jobs, and products. They are the ones who drive economic growth and innovation. If we want to create a better future, we need to support and encourage entrepreneurship.

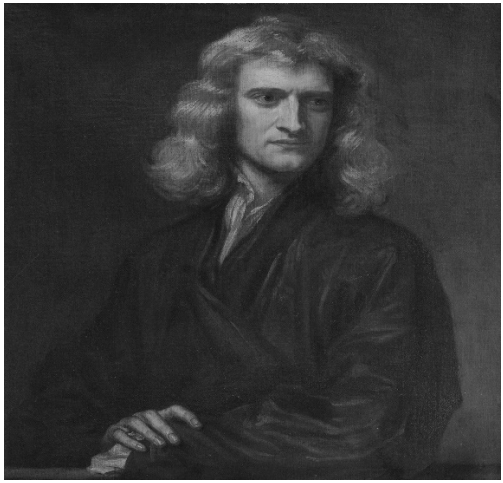
BONAPARTE'S TOP 6 SCIENTISTS WHOSE WORK IS STILL IMPACTING US

I ranked the top six scientists whose work still impacts our life. I ranked them based on their impact on our life and their contribution to humanity, rather than from the perspective of mainstream media. Mainstream media have never mentioned Professor Robert Lucas who is the founder of new world classical economics. Professor Lucas is the person who fought inflation, when Keynesian economic theory was leading and inflation was viewed as something normal. **Albert Einstein** is not number one; well, what Einstein did in his relativity theory is fairly brilliant and original but also counts as a continuation of previous work.

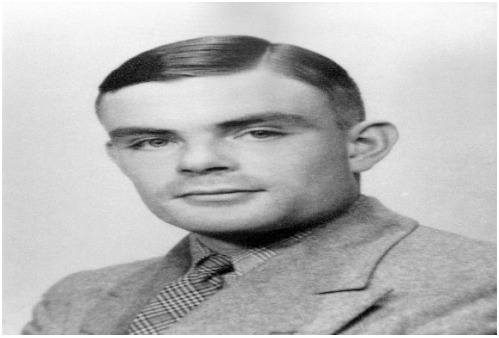
1. **Muḥammad ibn Musa al-Khwarizmi (780-850)**: a Persian polymath from Khwarazm who created vastly prominent works in mathematics, astronomy, and geography. Around 820 CE, Al-Khwarizmi was assigned as the astronomer and head of the library of the House of Wisdom in Baghdad during the Abassi Empire.



2. **Isaac Newton (1643-1727)**: an English mathematician, physicist, astronomer, theologian, and author who is considered to be one of the most influential scientists of all time. He is considered one of the most influential scientists in history, known for his work in physics and mathematics.

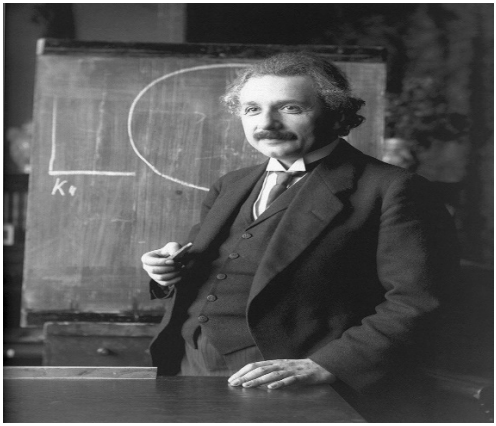


3. **Alan Turing (1912-1954):** an English mathematician, logician, cryptanalyst, and computer scientist. He is widely considered to be the father of theoretical computer science and **artificial intelligence**. He is best known for his work on breaking German Enigma codes during World War II.



4. **John Nash (1928-2015)**: was an American mathematician who made fundamental contributions to game theory, real algebraic geometry, differential geometry, and partial differential equations. Nash and fellow game theorists John Harsanyi and Reinhard Selten were awarded the 1994 Nobel Memorial Prize in Economics. In 2015, he and Louis Nirenberg were awarded the Abel Prize for their contributions to the field of partial differential equations.

5. **Albert Einstein (1879-1955)**: a German-born theoretical physicist who developed the theory of relativity, one of the two pillars of modern physics (alongside quantum mechanics). His work is also known for its influence on the philosophy of science. He is known for his groundbreaking theories of relativity and contributions to physics.

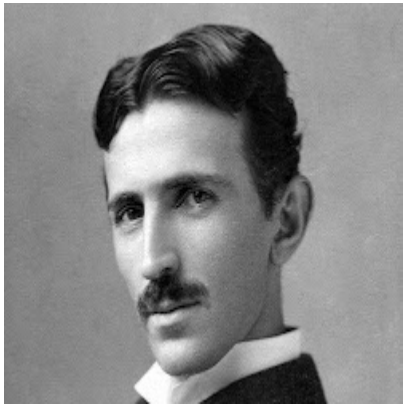


6. **Robert Lucas (1937-present)**: an American economist who was awarded the Nobel Prize in Economics in 1995. He is best known for his work on rational expectations, which is a theory that states that economic agents form their expectations about the future based on all available information.

TOP 10 INVENTORS

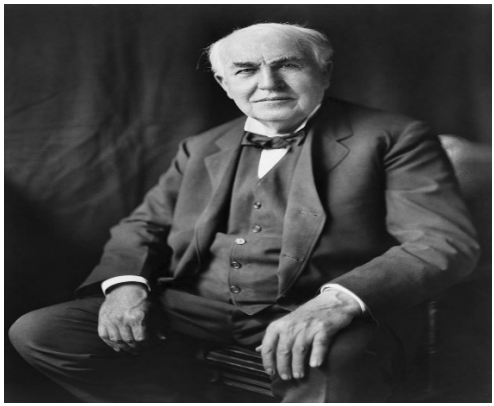
Determining the "top 10 inventors" is subjective and challenging because their contributions can vary across different fields and time periods. However, here are 10 individuals who have made significant contributions to innovation and are widely recognized for their inventions:

1. **Nikola Tesla (1856-1943)**: the Serbian-American inventor, electrical engineer, mechanical engineer, physicist, and futurist who is best known for his contributions to the design of the modern alternating current (AC) electricity supply system.



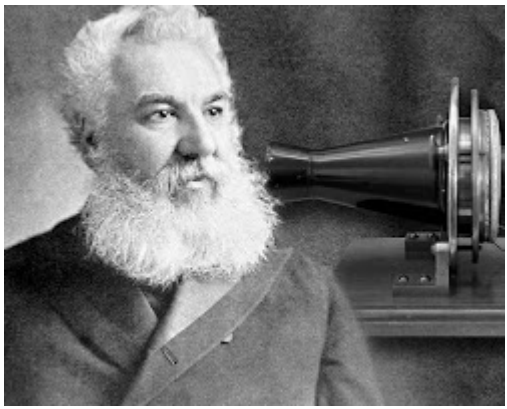
"https://en.wikipedia.org/wiki/Nikola Tesla"

2. **Thomas Edison (1847-1931)**: the American inventor and businessman who has been described as America's greatest inventor. He holds the record for the most US patents: over 1,000. His inventions include the light bulb, phonograph, motion picture camera, and mimeograph.

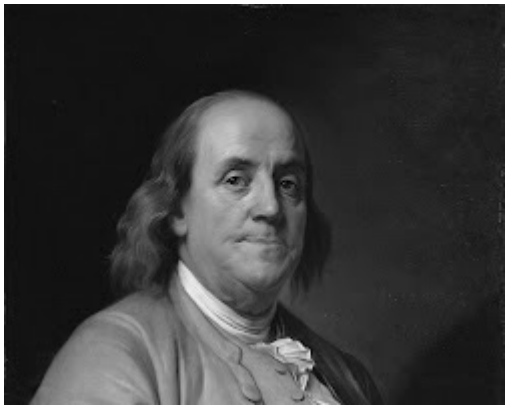


https://en.wikipedia.org/wiki/Thomas_Edison

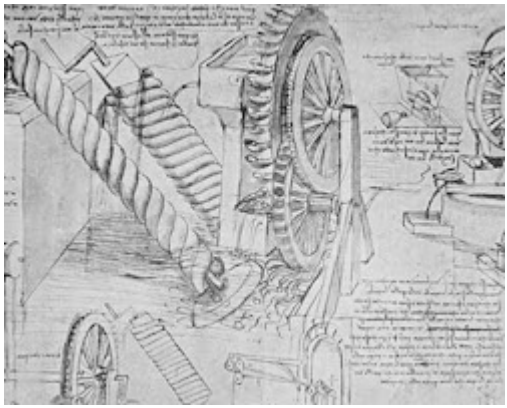
3. **Alexander Graham Bell (1847-1922)**: the Scottish-born American inventor, scientist, and engineer who is credited with inventing the first practical telephone. He also made significant contributions to the development of the field of audiology.



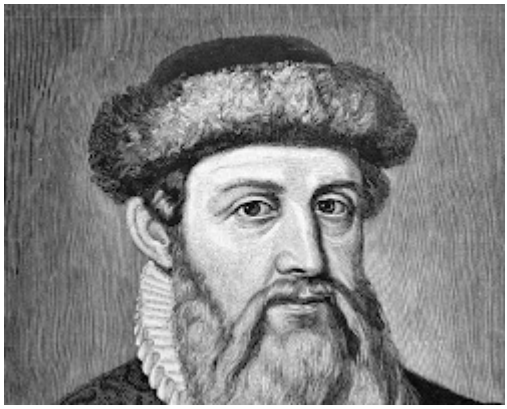
4. **Benjamin Franklin (1706-1790)**: the American polymath and one of the Founding Fathers of the United States. He was a scientist, inventor, statesman, diplomat, printer, publisher, and author. His inventions include the lightning rod, bifocals, and the Franklin stove.



5. **Leonardo da Vinci (1452-1519)**: the Italian polymath of the High Renaissance who was active as a painter, draughtsman, engineer, scientist, theorist, sculptor and architect. While his fame initially rested on his achievements as a painter, he also became known for his notebooks, in which he made drawings and notes on a variety of subjects, including anatomy, astronomy, botany, cartography, painting, and paleontology.



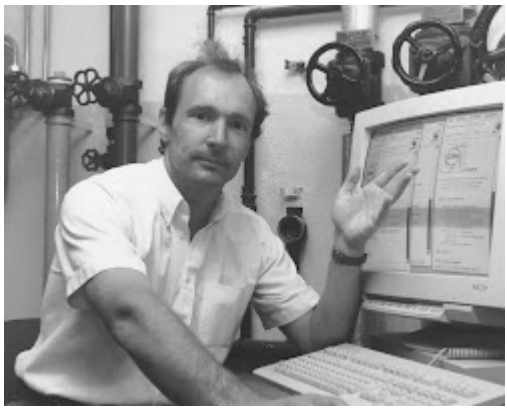
6. **Johannes Gutenberg (c. 1400-1468)**: the German printer and publisher who introduced printing to Europe with the movable type printing press. His invention revolutionized the way information was disseminated and helped to usher in the Renaissance.



7. **The Wright Brothers (Wilbur Wright and Orville Wright)**: American aviation pioneers who are credited with inventing, building, and flying the world's first successful airplane. Their first flight took place on December 17, 1903, at Kitty Hawk, North Carolina.

8. **Grace Hopper (1906-1992)**: the American computer scientist and United States Navy rear admiral who was a pioneer of computer programming. She was one of the first programmers of the Harvard Mark I computer, and she developed the first compiler for a computer programming language.

9. **Tim Berners-Lee (born 1955)**: the English computer scientist and inventor of the World Wide Web. He is also known for his work on the Enquire hypertext project, which was an early precursor to the World Wide Web.



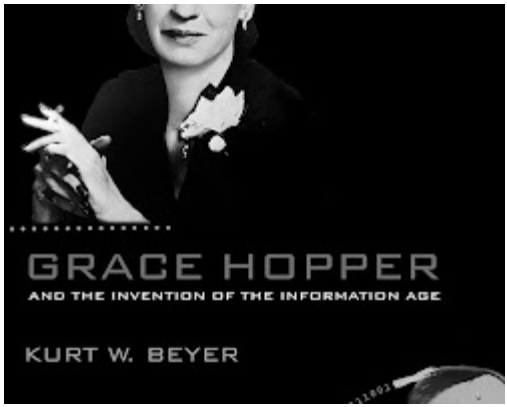
10. **Steve Jobs (1955-2011)**: the American business magnate, industrial designer, investor, and media proprietor who was the co-founder, chairman, and CEO of Apple Inc. He was a charismatic and visionary leader who helped to revolutionize the personal computer, music, and mobile phone industries.

This is just a small sample of the many great inventors who have made significant contributions to our world. Their inventions have changed the way we live, work, and communicate. We are all indebted to their ingenuity and creativity.

While mainstream media notably focuses on men when we talk about innovations, there are a large number of women inventors and their innovations; here are the top 5 women innovators in history:

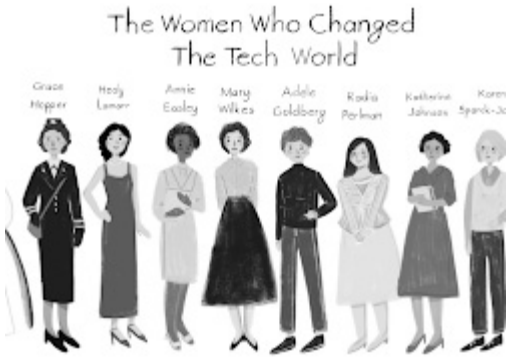
1. **Marie Curie (1867-1934)**: the Polish and naturalized-French physicist and chemist who conducted pioneering research on radioactivity. She was the first woman to win a Nobel Prize, the first person and only woman to win the Nobel Prize twice, and the only person to win the Nobel Prize in two different scientific fields. Her discoveries have had a profound impact on our understanding of the universe and have led to the development of many important medical treatments.

2. **Grace Hopper (1906-1992)**: the American computer scientist and United States Navy rear admiral. She was a pioneer in the field of computer programming and is credited with developing the first compiler for a computer programming language. She also made significant contributions to the development of the Harvard Mark I computer and the UNIVAC I computer.



3. **Hedy Lamarr (1914-2000)**: the Austrian-American actress and inventor. She is best known for her acting career, but she was also a brilliant inventor. She is credited with inventing the frequency hopping spread spectrum communication technology, which is used in modern wireless communication systems such as Bluetooth and Wi-Fi.

4. **Ada Lovelace (1815-1852)**: the English mathematician and writer, considered to be the first computer programmer. She is best known for her work on Charles Babbage's Analytical Engine, which is considered to be the first computer. She wrote a detailed description of how the Analytical Engine could be used to calculate Bernoulli numbers, which is considered to be the first computer program.



5. **Chien-Shiung Wu (1912-1997)**: the Chinese American physicist who made significant contributions to the field of nuclear physics. She is best known for her work on the Wu experiment, which disproved the conservation of parity in weak interactions. This discovery had a profound impact on our understanding of the universe and led to the development of new theories about the nature of matter.