50 WOMEN IN STEM

1. Dr. Ayanna Howard - An engineer and roboticist who has made significant contributions to the fields of artificial intelligence and robotics.
2. Dr. Eugenia Addy - A chemist who has made contributions to the development of new materials.
3. Dr. Donna Strickland - Won the Nobel Prize in Physics in 2018 for groundbreaking work in laser physics.
4. Dr. Chelsea Benally - the first indigenous woman to graduate with a PhD in engineering from the University of Alberta.
5. Mary G. Ross - Known as the first Native American engineer.
6. Dr. Lillian Dyck - Former Canadian Senator from Saskatchewan.
7. Dr. Eugenia Kumacheva - Renowned for her contributions to the field of chemistry, particularly in nanotechnology.
8. Dr. Molly Shoichet - A leader in the field of regenerative medicine and tissue engineering.
9. Dr. Victoria Kaspi - An astrophysicist known for her work on neutron stars and pulsars.
10. Dr. Jennifer Gardy - A molecular epidemiologist using genomics to study infectious diseases.
11. Dr. Joanne Liu - Former International President of Médecins Sans Frontières (Doctors Without Borders), a pediatric emergency medicine specialist.
12. Dr. Ursula Franklin - A physicist and metallurgist who made significant contributions to the understanding of materials.
13. Dr. Cynthia Goh - A prominent chemist focusing on developing new materials.
14. Dr. Janet Rossant - A developmental biologist known for her research on embryonic stem cells.
15. Dr. Bonnie Schmidt - Founder of Let's Talk Science, promoting STEM education across Canada.

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16. Dr. Helen Carswell - A pioneering microbiologist who made substantial contributions to the understanding of infectious diseases.
17. Dr. Elizabeth Cannon - A geomatics engineer and former president of the University of Calgary.
18. Dr. Chantal Barriault - A synthetic organic chemist recognized for her work in the field of catalysis.
19. Dr. Amina J. Mohammed - An environmental scientist and diplomat currently serving as Deputy Secretary-General of the United Nations.
20. Dr. Barbara Sherwood Lollar - A geochemist who made significant contributions to the understanding of ancient water systems.
21. Dr. Alice Wilson - One of the first Canadian women geologists, known for her work in the Appalachian region.
22. Dr. Molly S. Shoichet - A chemical engineer and biomaterials expert, known for her work in regenerative medicine.
23. Dr. Eugenia Duodu - A chemist and entrepreneur focused on developing sustainable skincare products.
24. Dr. Martha Salcudean - A pioneer in fluid dynamics and medical imaging, contributing to medical advancements.
25. Dr. Robyn Tamblyn - A health informatics researcher working on improving patient safety through technology.
26. Dr. Katie Gibbs - A biologist and science advocate, co-founder of Evidence for Democracy.
27. Dr. Elsie MacGill - The world's first female aircraft designer, known as the "Queen of the Hurricanes."
28. Dr. Katalin Karikó - A biochemist known for her work on mRNA technology, contributing to COVID-19 vaccines.
29. Dr. Indira Samarasekera - A metallurgical engineer and former president of the University of Alberta.
30. Dr. Molly Carnes - A physician and researcher focusing on gender equity in academic medicine.

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31. Dr. Louise Arbour - A former Supreme Court Justice and international human rights lawyer.
32. Dr. Lorna Casselton - A mycologist and geneticist recognized for her work on fungal biology.
33. Dr. Marie Giguère - A physicist and advocate for women in science, former president of the Canadian Association of Physicists.
34. Dr. Margaret-Ann Armour - A chemist and advocate for diversity in STEM fields.
35. Dr. Shohini Ghose - A physicist working on quantum information science and quantum computing.
36. Dr. Ruzena Bajcsy - A computer scientist and roboticist, known for her work in computer vision.
37. Dr. Ann Makosinski - An inventor and Google Science Fair winner for her thermoelectric flashlight.
38. Dr. Martha Piper - A biochemist and former president of the University of British Columbia.
39. Dr. Helen Burt - A pharmaceutical scientist focusing on drug delivery systems.
40. Dr. Yvonne Coady - A computer scientist specializing in distributed systems and open-source software.
41. Dr. Margaret Newton - A plant pathologist known for her contributions to agriculture and crop science.
42. Dr. Elizabeth Cannon - A geophysicist and former president of the University of Calgary.
43. Dr. Rita Rossi Colwell - An environmental microbiologist and former director of the National Science Foundation.
44. Dr. Brenda Milner - A neuropsychologist known for her work in the field of memory.
45. Dr. Elizabeth Bagshaw - One of Canada's first female physicians, a pioneer in family planning and birth control.

Dr. Ayanna Howard, an accomplished electrical engineer, was born on January 24, 1972, in Providence, Rhode Island. She completed her high school education at John Muir High School in Pasadena, California, and went on to earn a Bachelor of Science degree in engineering from Brown University in 1993. Howard furthered her education at the University of Southern California, where she obtained both her Master of Science and Doctor of Philosophy degrees in engineering in 1994 and 1999, respectively. Her Ph.D. research culminated in a dissertation titled "Recursive Learning for Deformable Object Manipulation."

During her tenure at the University of Southern California, Howard also contributed her expertise to NASA's Jet Propulsion Laboratory in Pasadena, California, where she assumed several roles, including computer scientist, information systems engineer, and senior robotics researcher, until 2005. In addition to her work at NASA, Howard enhanced her educational background by obtaining a Master of Business Administration degree from Claremont Graduate University in 2005. The same year marked a significant milestone in her career as she joined the Georgia Institute of Technology. There, she established her laboratory and served as an associate professor in the School of Electrical and Computer Engineering. Howard's research group, known as the Human-Automation Systems (HumAnS) Lab, dedicates its efforts to advancing robot autonomy.

Howard has made significant contributions to the field of robotics and engineering, earning her widespread recognition. Notably, her SnoMote robots gained international acclaim in 2008 for their role in analyzing the effects of climate change on the Antarctic ice shelves. Howard's scholarly output includes over one hundred academic publications, and she has received multiple awards for her work. Among these accolades are the 2001 Lew Allen Award for Excellence in Research from the Jet Propulsion Laboratory, the 2005 Early Career Award in Robotics and Automation from the Institute of Electrical and Electronic Engineers, and the 2009 Janice Lampkin Educator Award from the National Society of Black Engineers.

1. Which universities awarded Ayanna Howard her academic degrees, and what were those degrees?
2. What significant project did Ayanna Howard lead involving robots, and what was its goal?
3. List some of the roles Ayanna Howard held at NASA's Jet Propulsion Laboratory.
4. Considering Ayanna Howard's advancements in robotics for environmental research, how do you think robots like the SnoMote can impact future studies on climate change?
5. Reflect on Ayanna Howard's career path, from her education to her significant contributions to robotics. How does her journey inspire potential future scientists and engineers, especially girls and underrepresented minorities in STEM fields?

Dr. Eugenia Addy, is a highly regarded scientist, communicator, and social entrepreneur who brings her dynamic advocacy and leadership as the CEO of Visions of Science. Her mission is to drive transformation, not solely within communities, but across society and the global sphere, anchored in the principles of equitable STEM access. Over a distinguished career spanning more than 15 years,

she has tirelessly championed youth initiatives across over 50 "low-income" communities across the Greater Toronto and Hamilton Area. This vast experience has made her a sought-after public speaker, with a notable presence on over 80 speaking platforms, including TEDx. Eugenia's influence extends beyond the podium. Her life and work have been featured prominently in influential publications such as Toronto Life, The Toronto Star, The Globe and Mail, and CBC, highlighting her profound impact in the realms of STEM and community development. Dr. Addy's commitment to excellence is underscored by her numerous accolades, including the Desmond Parker Outstanding Young Alumni Award from the University of Toronto (UTM) and the Life Sciences Ontario Community Service Award. Her contributions reach into educational consultancy

and subject matter expertise, further extending into STEM-focused media initiatives with institutions such as TVOkids and the CBC. Eugenia acts as a trustee and director on several boards, including the Ontario Science Centre, the Toronto Foundation, and the Counselling Foundation of Canada. Eugenia's academic qualifications include an Honours Bachelor's degree in Chemistry and Biology, as well as a PhD in Chemistry from the University of Toronto. Her journey has recently earned her an honorary doctorate from Mount Saint Vincent University, cementing her enduring impact in the fields of STEM education and community transformation. Eugenia is also a wife and mother who enjoys spending time with her family, friends, and soaking up as much sun as possible.

1. Describe Dr. Eugenia Addy's roles and contributions as the CEO of Visions of Science. How has she utilized her position to advocate for equitable STEM access and societal transformation?
2. How has Dr. Addy's work in over 50 "low-income" communities across the Greater Toronto and Hamilton Area influenced her recognition as a public speaker? Provide examples of her speaking engagements and discuss the impact of these platforms on her mission.
3. Considering Dr. Addy's extensive work in promoting STEM education within low-income communities, what might be the long-term societal impacts of such initiatives?
4. How does ensuring equitable access to STEM education in various communities contribute to broader societal transformation?

10 Research Questions For Students

1. Dr. Donna Strickland won the Nobel Prize in Physics. What is the science behind her groundbreaking work in laser physics, and how has it impacted technology today?
2. Explore the field of regenerative medicine and tissue engineering led by Dr. Molly Shoichet. How does her research contribute to advancements in medical treatments and surgeries?
3. Investigate the work of Dr. Victoria Kaspi in astrophysics, specifically her research on neutron stars and pulsars. What role do these celestial bodies play in our understanding of the universe?
4. How has Dr. Eugenia Kumacheva's research in nanotechnology influenced the development of new materials and their applications in various industries?
5. Dr. Ursula Franklin was a physicist and metallurgist. Explore her contributions to the understanding of materials and their applications in different fields.
6. Examine the role of Dr. Joanne Liu as a pediatric emergency medicine specialist and her leadership in Médecins Sans Frontières. How does her medical expertise contribute to global healthcare efforts?
7. Learn about the impact of Dr. Bonnie Schmidt's organization, Let's Talk Science. How does it promote STEM education, and what initiatives have been successful in inspiring students?
8. Dr. Elizabeth Cannon, a geomatics engineer, made significant contributions. What is geomatics engineering, and how is it applied in various industries, including environmental science?
9. Investigate the work of Dr. Cynthia Goh in synthetic organic chemistry. What are the practical applications of her research, and how does it contribute to the development of new materials?
10. Dr. Alice Wilson was one of the first Canadian women geologists. Explore her contributions to the field of geology and the role of women in early scientific exploration.

Investigate 10 Careers in STEM

1. What are a computer programmer's key responsibilities and day-to-day tasks, and how does their work contribute to technological advancements?
2. How does a biomedical engineer contribute to the field of medicine, and what are the challenges they may face in developing innovative medical technologies?
3. What educational and professional paths can a marine biologist take, and how do they contribute to our understanding of marine ecosystems and conservation efforts?
4. How does a civil engineer play a crucial role in designing and constructing infrastructure such as bridges and roads, and what skills are essential for success in this field?
5. What are the various career paths within the field of environmental science, and how do professionals in this field work to address environmental challenges and promote sustainability?
6. How does a data scientist use mathematics and programming skills to analyze and interpret large sets of data, and what impact do they have on industries such as finance, healthcare, and technology?
7. What role do aerospace engineers play in developing aircraft and spacecraft, and how does their work contribute to advancements in transportation and exploration?
8. How does a chemical engineer contribute to developing new materials, pharmaceuticals, and energy sources, and what ethical considerations are important in this field?
9. What are the different specializations within the field of robotics, and how do robotics engineers design and create robots to solve real-world problems in industries like manufacturing, healthcare, and exploration?
10. How does a career in mathematics research contribute to our understanding of complex mathematical concepts, and what opportunities exist for mathematicians in various industries beyond academia?

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