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## E-Newsletter | December 2010

### Early Women Pioneers in Mathematics and Computer Science



To celebrate [Computer Science Education Week](#), **Her Story**, along with the **National Center for Women and Information Technology (NCWIT)** hosted a birthday party on December 9th at the University of Colorado, Boulder for Admiral Grace Murray Hopper, the mother of the modern computing age.

Although she passed away nearly 20 years ago, "Amazing Grace" and her legacy live on in every computer and mobile device. This month, we are pleased to salute early women pioneers in mathematics and computer science. Come with us as we recognize Emmy Noether, Grace Hopper, and Anita Borg. They have all helped make possible the transformative and central role that computers and computing have in our society today.

Mathematician **Emmy Noether** grew up in Germany at a time when women were not allowed to attend college preparatory schools. After receiving her certificate to teach from a finishing school, she defied society conventions and, in 1907, earned a PhD in Mathematics. By 1918, she had proven two theorems that were basic for general relativity and elementary particle physics; one is still known as "Noether's Theorem."

During the 1920s, Noether did foundational work on abstract algebra, working in group theory, ring theory, group representations, and number theory. Noether's conceptual approach to algebra led to a body of principles unifying algebra, geometry, linear algebra, topology, and logic. The "Noether School of Mathematics" would prove very useful for physicists and crystallographers. Noether immigrated to the U.S. in 1933 and taught at Bryn Mawr College.



Emmy Noether



Grace Hopper

Computer innovator **Admiral Grace Murray Hopper** is celebrated for her invention of the computer compiler, the computer software that translates human languages into the zeroes and ones that a computer recognizes. Hopper's computing career began during World War II when she worked at Harvard on the early computers. There she discovered the first computer bug - a moth - stuck in the relays of the computer that was used to calculate missile trajectories in support of the war efforts.

Admiral Hopper developed the first English computer language called Flowmatic. She was instrumental in the development of the computer programming language COBOL - Common Business Oriented Language. Hopper received the National Medal of Technology and has been inducted into the National Women's Hall of Fame. The Destroyer Hopper (CGG-70) is named for her. The destroyer's nickname is "Amazing Grace". Truly, Admiral Hopper's efforts helped pave the way for the information age today.

Computer scientist **Anita Borg** had a vision that involved women embracing and using technology, instead of fearing it. She touched and changed the lives of countless women in the computing fields and well beyond. Borg founded the Sysyters online community in 1987; this was before the concept of an online community was a part of the mainstream. In 1994, she co-founded the Grace Hopper Celebration of Women in Computing. In 1997, she founded the Institute for Women and Technology which encompassed her earlier endeavors and began new programs, partnerships, and initiatives to include women in all aspects of technology. After her death, it was renamed the Anita Borg Institute.

We salute the accomplishments of these pioneering women in computing and invite you to explore the resources available online on the [Computer Science Education Week](#) web site as well as on the [Her Story](#) web site in sharing with your community.

### ***Next Month:*** **Women as Humanitarians**

**Her Story: A Timeline of the Women Who Changed America**  
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