Women Doing Mathematics

Whether they do mathematics for the sheer intellectual challenge, or for the critical insights it brings to solving important theoretical and real-world problems, women mathematicians love what they do.

Some work alone or in collaboration with other mathematicians. Others work as members of interdisciplinary teams. Many of them also teach at the college or university level, while others are employed in industrial or government laboratories.

Highlighted here are just a few of the women doing mathematics today.

Ivelisse Rubio, PhD.

photo by Angel Garcia

Her research interests are applications of computational algebra, finite fields, latin squares, and coding theory, which has applications in the internet, deep-space telecommunications, satellite broadcasting and data storage. She has also organized and directed many undergraduate research programs and projects.

"Mathematics is a world where there is no certainty; nothing is true until you prove it. I love the challenge of facing a problem that has not been solved, that it is not easy to solve and maybe no one will solve! Working in mathematics is also my way of being different."

Rebecca Goldin, PhD.

Her research is in symplectic geometry, group actions and related combinatorics. She is Director of Research for the Statistical Assessment Service, a nonprofit media education and watchdog group affiliated with George Mason University concerned with the media's use of statistics and mathematics.

"Mathematics for me touches on all the core joys of the human mind. It has rules, patterns, and structure, yet leaves so much room for creativity and invention. It impacts society deeply—from the roots of our education to the leading edge of science and technology—yet distinguishes itself by its sheer purity and abstraction. And there is almost nothing like the "aha!"moments that come with learning, teaching, understanding, or discovering something new in mathematics."

Andrea L. Bertozzi, PhD.

photo by Mary Watkins/UCLA

She develops mathematical methods and frameworks necessary to solve a diverse host of modern problems such as analyzing crime patterns, control of robotic vehicles, and fundamental physics of complex fluids. Her research brings together ideas from differential equations, inverse problems, and statistical physics.

"I really enjoy working with students on applied mathematics research. It's very rewarding to train students to make an impact in diverse areas of science and engineering using the mathematics that they develop."

Trachette Jackson, PhD.

"She uses mathematical models, computer simulations and model-driven experiments to advance the current understanding of tumor growth and angiogenesis and to quantify the relative impact of new, cell-specific treatment strategies on the pathobiology of cancer."

"Many of the challenges of contemporary biology and medicine lie at the intersection of the mathematical and biological sciences. Working at this interface and continually striving to further integrate the fields of mathematics and biology is both exciting and rewarding. There's nothing I'd rather be doing with my career!"

Bryna Kra, PhD.

Her research lies in dynamical systems and ergodic theory, with a focus on problems related to combinatorics and number theory. She was awarded a Centennial Fellowship of the American Mathematical Society in 2006 and the Conant Prize in 2010.

"Every addition to our collective mathematical knowledge is a small triumph, from a child discovering a pattern, to a student solving an exercise, to a researcher taking a step in the proof of a new theorem. But nothing compares to the pure exhilaration that comes with proving an old conjecture or drawing a connection between seemingly unrelated concepts. Mathematics is the language for communicating such insights, connecting centuries of past research with future advances."

Sommer Gentry, PhD.

Her research in optimization in kidney transplantation has been profiled in *Science* and *TIME* magazine and on television. She serves as an advisor to both the U.S. and Canada in their efforts to create national paired donation registries, and her research group helped lobby Congress to clarify the legal status of kidney paired donation.

"I chose operations research because I wanted to make a difference to people's lives. Operations research is like a toolkit that's used everywhere: transportation, network security, credit cards, international relations, robotics, transplantation—I've worked in all these areas! If you master mathematical modeling you can be a contributor to almost any area of human endeavor."

Melanie Wood, PhD.

While a high school student she became the first female American to make the U.S. International Math Olympiad Team. While at Duke University she won a Gates Cambridge Scholarship, Fulbright fellowship, and a National Science Foundation graduate fellowship, became the first American woman to be named a Putnam Fellow, and also pursued her interest in theater. She continues her research in algebraic number theory and algebraic geometry at Stanford University.

"Insight. Originality. Inspiration. New perspectives. Opening your mind. Finding a different way. Playing around. That is mathematics. There is a myth that mathematics is about memorization, technicalities, formulas and equations—there is only one correct answer. This picture utterly fails to describe the creative process that is professional mathematics."

Abigail Thompson, PhD.

Her current research is in low-dimensional topology and knot theory. As a consequence of her work, the concept of 'thin position' has emerged as a major tool for attacking some of the fundamental problems in the study of 3-manifolds.

"Some human constructions are unreasonably appealing, resonating with the part of our brain that recognizes beauty: suspension bridges, kites, sailboats, cellos, and elegant mathematical arguments."

Maria Chudnovsky, PhD.

She studies the properties of graphs, and was part of a team of researchers that proved a hypothesis in graph theory that had stumped mathematicians for 40 years. In addition to its mathematical beauty, graph theory can be a useful tool in operations research, computer science and engineering.

"One of the best things about mathematics is that it teaches you to think clearly, no matter what you are thinking about."

For more information on women mathematicians and their work see www.ams.org/women-mathematicians

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