

***Nakama* - Sharing the Joy of Mathematics**

By Sora Shirai

Hanover High School

Interviewee: Makiko Sasada

From a young age, Makiko Sasada was the type of girl who loved spending hours solving logic puzzles at home. She loves mathematics because of the thrill she feels when she finally realizes the single line, angle, etc. that will help her solve a problem she's spent hours thinking about. Most of all, she enjoys sharing these realizations with "*nakama*" or other people who equally love mathematics, and discussing the potentially infinite other ways to solve the problem.

However, as she pursued mathematics, Sasada quickly noticed the gender gap prevalent in the field. By the time she was in her third year at the University of Tokyo, she was the only female student left pursuing a degree in mathematics in her grade, and the years above and below her had zero women. While she enjoyed collaborating with her other male classmates on math problems, she often wished that there were other female students as well.

Unfortunately, the hardships she faced as a woman in the field only continued as she pursued her PhD. In addition to the general worry of "whether I'll be able to eat and live as a mathematician," Sasada had worries of continuing as a researcher while also wanting to have a family. With no other female math students and with a lack of female role models (at the time there was only one female associate professor in the mathematics department at the University of Tokyo), she turned to her male comrades for advice. However, rather than being encouraged, she was told that "the world of mathematics isn't that easy" and that "she couldn't have both, but would need to sacrifice one or the other."

Despite these hardships, Sasada's love for mathematics kept her going. Traveling to other countries for conferences, she saw mathematicians from around the world who not only enjoyed mathematics but also spent time pursuing other hobbies such as music or film. Meeting people from other countries helped her understand that she didn't have to choose math over all other lifestyles in order to be a mathematician. Rather, she realized that the core of being a mathematician was enjoying the wonders and mysteries hidden within the subject, and that she didn't have to sacrifice other things in order to realize this.

Today, Sasada is an associate professor at the University of Tokyo Graduate School of Mathematical Sciences. Sasada's current research focuses on statistical physics and understanding how rules governing the movement of atoms and particles in the micro-scale can be used to create mathematical models to predict macro-scale phenomena such as water flowing or heat spreading. In addition to teaching and research, Sasada also works as an associate editor for the Probability Theory and Related Fields Journal and the Probability and Statistics section of the *Annales de l'Institut Henri Poincaré*.

Sasada is also now a proud mother for two beautiful children. When asked how she balances it all, she explained the importance of collaboration in her current workspace. Sasada utilizes her strength of coming up with innovative ideas and being creative with solutions, while her teammates shine in other dimensions. Sasada explains that this collaboration among researchers has allowed her to continue pursuing mathematics research and spending invaluable time with family. In addition, Sasada expressed

gratitude for her secretary who supports her not only when her children suddenly get sick, but also serves as another friend and fellow mother with whom she can talk to and receive advice about raising children.

Despite her busy schedule, Sasada makes time to continue her efforts to increase the “*nakama*” of math lovers in Japan as one of the co-organizers of the Catch-all Mathematical Colloquium of Japan. Through hosting monthly virtual meetings open to any interested mathematics students in Japan, the colloquium aims to increase diversity in the math community in Japan by highlighting mathematicians from a variety of backgrounds to share their career paths and life journeys.

Sasada also started the “*Suri Joshi*” (which translates in English to girls who pursue math) initiative in Japan to share the joy of mathematics with more girls and women throughout the country. The idea originated from her conversations with Professor Bannai Kenichi while she was working at Keio University as an assistant professor. Through discussing why there were so few women pursuing mathematics at the university level, Sasada realized that perhaps one of the biggest reasons for the gender gap was due to a large gap in information accessible to male and female students.

This led to her creation of the “*Suri Joshi*” website. Through the site, Sasada provides an easily accessible platform through which middle and high school girls in Japan can learn more about how interesting, fun, and important mathematics is. With articles ranging from those on how mathematics can be applied to various fields to stories of female role models who currently pursue mathematics, the website encourages girls interested in mathematics. In fact, Sasada has received messages from female students who are now pursuing mathematics in graduate school after reading the site as a high schooler. One graduate school student even helps as one of the editors for the “*Suri Joshi*” website now, after being a reader of the website herself.

When asked if she has any advice for girls interested in pursuing mathematics, Sasada immediately responded with great enthusiasm that “Mathematics is fun!” and that “The more you pursue mathematics, the more fun it is.” She also explained that “Even if the people immediately around you don’t think the things you find interesting are fascinating, by looking further beyond, and visiting other communities and countries, you can find someone else who also shares a passion for what you’re interested in. So don’t give up on your interests, but pursue them!”

Finally, when asked about her next goal for the future, Sasada replied that she wants to continue exploring the vast areas in mathematics that fascinate her, and continue finding joy in mathematics research. For her, rather than focusing on one particular problem, “happiness is being in a state where I have lots of things that I want to continue exploring.” At the same time, as an educator, Sasada hopes to continue increasing the community of women interested in mathematics in Japan—and find more “*nakama*” with whom to share the beauty and joy of mathematics.

Sora Shirai is a 12th grader at Hanover High School. She loves mathematics and all fields of science. She also plays the violin and viola and has participated in various national orchestras. She is a co-founder of the HHS French Club, member of HHS a cappella group Dachords, and plays soccer and unified basketball. In her free time she likes to read, sleep, cook sweets, and memorize pi.