Meet a Member: Liz Holm, Creating Unique Kitchen Chemistry

By Francine Garrone

Standing in front of her kitchen stove, Liz Holm is reminded of her days spent in the laboratory. Now a computational materials scientist, her work is done in the virtual world, and those early hands-on experiments are nothing more than a pleasant memory. However, Holm, a member of the TMS Board of Directors, has found canning jams, jellies, and preserves to be a way to relive those laboratory experiences.

A distinguished member of the Technical Staff in the Computational Materials Science and Engineering Department at Sandia National Laboratories, Holm brings her materials science background into the kitchen when making preserves and canning harvest from her vegetable garden and fruit trees. "Food preservation has a lot in common with materials science," she said. "In both cases, we manipulate composition and processing to create optimal properties. But in materials science, it is unusual to eat the product."

Holm became interested in gardening and canning while growing up. Her father was an avid gardener and it is from him that she believes she inherited the attitude "I'm not going to plant it and care for it if I can't eat it."

"In the middle of the summer when the garden is producing all those wonderful things to eat, it is just natural to want to save the surplus for wintertime," she said. "There is nothing to warm up a cold, dark winter night like popping open a jar of peaches from my 50-year-old tree and tasting a bit of the warm New Mexico sun."

Holm began her experiments in kitchen chemistry with the easiest preserving method—freezing jams and jellies—before advancing to high-acid, high-sugar preserves canned in boiling water. She later graduated to pressure-canning low-acid foods.

To make preserves, the fruit or vegetables must first be peeled, blanched (steamed to loosen the skins), chopped, or flavored. Vinegar or lemon juice is then added to make the mixture unfriendly to microbes by giving it a low pH balance. Sugar is also added not only to prevent spoilage, but when combined with pectin, a natural gelling agent, it helps to thicken jams and jellies. Once the mixture is correctly prepared, it is placed in canning jars and sealed using a two-part lid.

Holm then applies heat to the jars to kill remaining microbes and to drive out any air. "In boiling water canning, I immerse the jars in boiling water for a time sufficient to kill microorganisms," she said. "The heat also causes the air in the jar to expand and escape from under the lid. When the jar cools, there is very little air remaining inside, and the negative pressure differential sucks the lid tightly onto the jar. The product is then shelf stable and can be stored at room temperature." Pressure canning works the same way, except the jars are processed at a higher temperature, according to Holm.

Holm's garden consists of tomatoes, cucumbers, green chile peppers, and green beans. She also has peach, pear, sour cherry, apple, apricot, and plum trees. However, not all of the fruit she uses for her preserves comes from her backyard. Holm uses local apples, pumpkins, berries, sweet cherries, watermelon, and cactus too. "There is an orchard in New Mexico that grows wonderful heirloom apples on very old trees," she said. "They don't know what variety they are—they call them No Names—but I've never tasted better applesauce than my No Name applesauce."

Holm preserves some of her foods in light syrup and others have an added touch. "One local favorite is green chile apple jelly, which combines sweet with heat," she said. Holm entered her preserves in the New Mexico State Fair this year for the first time. Her watermelon-rind pickles received a first-place ribbon and her cherry preserves and blueberry jam received second-place ribbons.

"A friend gave me a very old recipe for watermelon pickles that uses some unusual ingredients," she said. "The result is a richly spiced, sweet pickle that looks beautiful in the jar and has a firm but yielding texture. My family loves them, and apparently the judges did too."

Liz Holm poses next to a showcase containing award-winning preserves, including her watermelon rind pickles.

Each month, *JOM* features a TMS member and his or her activities outside of the realm of materials science and engineering. To suggest a candidate for this feature, contact Francine Garrone, *JOM* news editor, at *fgarrone@tms.org*.