In the United States, one in nine babies are born prematurely according to the Centers for Disease Control and Prevention. Early in her career, Dr. Rita Loch-Caruso had no idea her work would be dedicated to helping children and pregnant women, but now, it's all about the kids. "It's really important we protect individuals at this vulnerable time," she says, "because they are total, complete victims."

Dr. Rita Loch-Caruso, 61, is a professor at the University of Michigan and has published over fifty scholarly articles on reproductive toxicology. Her job as a toxicologist is to tell a story to explain how and why environmental contaminants cause preterm births. She is also interested in spreading the knowledge she has gained in her career, even if she did not begin with an interest in pregnancy.

After receiving her Bachelor of Science in Biology and Bachelor of Arts in psychology from the University of Cincinnati, Loch-Caruso entered the field of toxicology by accident. She disliked her work in a biomedical laboratory, so a friend suggested talking with Dr. I. Arthur Michaelson, a toxicologist. Shortly after, Michaelson convinced Loch-Caruso to apply to a PhD program in toxicology, which she began in 1976.

She wanted to focus on the brain, looking at how toxins modify gap junctions, which are connections between cells. Unfortunately, the technology did not exist at the time to conduct these studies, but through this work, she did learn that these junctions are critical for the beginning of labor. With this insight, her research focus transformed from the brain to the uterus, and her career in reproductive toxicology began.

Since 2003, she has taught an undergraduate course in toxicology to help introduce students to the subject earlier. Between three and six students from her undergraduate class in toxicology join the University of Michigan Toxicology department each year.

Christine Greene, a previous graduate student instructor for the course, explains that though Loch-Caruso has many undertakings and students, "She is in tune and in touch with every project."

For one project, she is looking to explain the high preterm birth rate in Puerto Rico. According to the Center for Disease Control and Prevention, over 16% of births there are preterm. Jose Cordero, dean of the University of Puerto Rico's School of Public Health, could not explain this and has asked Loch-Caruso to help figure out what is causing these preterm births.

"My preference for research is to think of it as solving puzzles," she says. "I want to put the puzzle pieces together."

Through the National Institute of Health Science's Superfund research program, Loch-Caruso is currently looking at trichloroethylene (TCE) as a possible piece to this puzzle. TCE is a chemical commonly used in dry-cleaning and often moves into groundwater from dumpsites but its effect on the placenta is unknown.

"It's amazing that TCE has been this common contaminant in environment and groundwater, and no one even bothered to look at its metabolism in the placenta," says Loch-Caruso.

TCE easily becomes a gas, which makes it hard to study. Loch-Caruso's research avoids this issue by focusing on a chemical that the body makes from TCE called dichlorovinyl cysteine (DCVC). After exposing rats to this chemical, the babies have low birth weights along with other birth problems.

Next, her lab will check to see whether the placenta actually makes DCVC from the pollutant TCE in rats. Human studies will follow but will require more work because "the chemicals don't hang around very long in humans," Loch-Caruso says.

Loch-Caruso decorates her desk with a framed cartoon drawn by her son and pictures of her two children, now ages 20 and 24, but both are almost ten years old. Her son calls this embarrassing, so she has put her husband in charge of updating the pictures. "Keeping a balance is a real trick," she says.

To help with the stress, she sits down with a novel before bed every night. Of course, her favorite books are detective stories, especially those that are about topics she is not familiar with.

Although Loch-Caruso loves gathering information, she wants to end her career by spreading information instead. This starts with her undergraduate course, but she hopes to someday step back from the daily academic routine and work on developing ways to translate, explain, and apply toxicology.

"I want to see my work translated into action," she says.