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Dr. Joan Lynam

By Julia McCown, Chemical Engineering Junior

Assistant Professor Dr. Joan Lynam has been teaching chemical engineering classes at Louisiana Tech for a little over three years. When not teaching classes, Dr. Lynam is busy running the Biomass Lab, in which she and her undergraduate student members research turning waste from various processes into useable products. She grew up in Pittsburg, Pennsylvania; therefore, in her words, “[she] must be a Steelers fan.” Both her father and her brothers are chemical engineers as well.

For her undergraduate degree, Dr. Lynam attended Case-Western Reserve University with a full ride. Although her father feared it would be too difficult for her, she decided to pursue a career in chemical engineering, having previously enjoyed physics and chemistry in school.

After she received her undergraduate degree, Dr. Lynam researched rubber for Goodyear. At Goodyear, she researched how to improve rubber strength and understand the underlying reasons why additives, such as resin, make rubber more resilient. Her interest in conservation research began there when she realized that one fungal infection or disease could kill a whole continent’s worth of the trees that rubber is made from, since all rubber trees are clones.

After working for Goodyear for a while, she decided to take a break so she could raise her kids. Soon after, she decided to go to graduate school in Reno, Nevada, to refresh her knowledge and return to chemistry. While at the University of Nevada at Reno, she enjoyed researching for her master’s degree, and she applied for a doctorate soon after. After earning her Ph.D., she received offers from several schools, but ultimately chose to teach at Louisiana Tech because she liked the people here.

All of the Biomass Lab’s projects are led by Dr. Lynam. The lab focuses on turning waste into products to address the culture of waste that Dr. Lynam believes the United States has developed. The nation is dependent on single-use, convenient

products, and she believes the U.S. should try to approach waste the same way that Europe does. In Europe, they recycle as much as they can, with bones being one of the few pieces of biomass tossed in the trash. She wants “Americans to consider the planet more than their own convenience.”

She especially enjoys working on a project in collaboration with the Environmental Protection Agency (EPA) to help coordinate the exchange of wastewater from paint companies to cement production companies that include the waste in their product. The result is a win-win situation, as the paint companies do not have to pay to cleanse and release the water and the cement production company does not have to pay for city-provided water.

In another project, Dr. Lynam is working with lion manure, which cannot be composted since lions are carnivores. For such manure, a process called hydrothermal carbonization is used to increase the fuel potential of a raw biomass through high heat and pressure. Once the manure reaches a high enough temperature, it is sterilized and formed into pellets, which are extremely resilient and easy to transport. These pellets can then be burned for energy. A large portion of her work also involves the use of deep eutectic solvents (DESs), since they are biocompatible solvents. DESs are used to break down biomass into lignin, cellulose, and hemicellulose. The lignin can be made into pellets to be used for fuel as a binder or as a plasticizer in cement. The cellulose and hemicellulose can be used to make biofuels.

Dr. Lynam is a fascinating professor who cares about the students she works with and wishes for her students to succeed. One of her favorite parts of being at Tech is working in the Biomass Lab, since all the projects are brand new. She provides the students an opportunity to research something that has never been researched before, and she is so proud to give that chance to her students.