1. **Name:** Lyra Reynolds

2. **Title:** How do metabolic stoichiometric ratios and alkalinity influence whole-stream metabolism estimates from carbon dioxide signals?

3. **Short Description:** Hello, my name is Lyra Reynolds. I am an undergraduate student at Montana State University. Whole-stream metabolism is quantified through dissolved oxygen and dissolved inorganic carbon driven metabolic processes. These metabolites are used in inferential modeling for metabolism, which conventionally uses DO but there has been an increase in using DIC for models. However, when trying to use DO and DIC dynamic modeling together, the metabolism estimates are not matching. This disconnect in metabolism estimates motivates us to see what stoichiometry and alkalinity can do to help the estimates match. The photosynthetic DIC:C fixation ratio was adjusted from -1 (shown in light blue) in the model to determine the ratio necessary for DO and DIC metabolism to match. The analysis showed that a ratio of -0.32 was needed to get the estimates close to each other, which results in a O:C photosynthetic quotient around 3. This PQ is much higher than typically estimated and there is still error in the model fit, which suggests stoichiometry is not the only factor for variation. Alkalinity was also adjusted in the model as a heuristic exercise to examine the influence of alkalinity on metabolism simulations. This analysis was run with the metabolism model assuming that the upstream DIC concentration was known, which showed large variation in the $pCO_2$ signals, and again assuming upstream $pCO_2$ was known. The results demonstrated the importance of alkalinity when linking DIC to $pCO_2$ but showed that when upstream $pCO_2$ is known that the choice of alkalinity does not appear to be important for mathematical considerations of metabolism estimates based on $CO_2$. Further research into the error of model predictions from stoichiometry and alkalinity is necessary to use DO and DIC together to estimate metabolism. Thank you.

4. **Link:** https://youtu.be/LLJhhVh-ufw

5. **Short Description Video**

6. **Link:** https://youtu.be/LLJhhVh-ufw