

Abstract Submitted
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**Determining Suction Feeding Efficiency in the Bowfin fish (*Amia*)
using Particle Image Velocimetry and Computational Fluid Dynamics**

YENNY RUA, KARIM KHARBOUCH, Fairfield Univ, CHRISTOPHER SANFORD, Hofstra University, SHANON RECKINGER, Fairfield Univ — Suction feeding is the most common form of prey capture in aquatic vertebrates. During the early evolution of fishes there was a major change in shape of the mouth, from a wedge shaped mouth opening in more primitive fishes to a more circular and planar mouth. This change in shape resulted from increased mobility of a key upper jaw bone, the maxilla. It has been suggested that this change in shape dramatically increased suction feeding efficiency. This study examines the hydrodynamic effects of these two mouth shapes in the same animal, the bowfin fish (*Amia calva*). 2D Particle Image Velocimetry (PIV) is used to analyze suction feeding events. Post-processing algorithms have been developed to determine the flow rate of water into the mouth of the fish; the area of fluid, the velocity of fluid and the volume of fluid affected by the fish; the velocity of the fluid at the mouth, as well as the velocity of the fluid as a function of the distance from the mouth, finally the force exerted on the fluid by the fish is also determined. Lastly, a numerical model has been developed for comparison using a non-uniform mesh, which adapts dynamically in space and time to the fish feeding event. The realistic geometry of the fish's head is modeled in CAD.

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