Turns and maneuvers during swimming[1] AMNEET BHALLA,
NOAH MOSBERG, RAHUL BALE, NEELESH PATANKAR, Department of Mechanical Engineering, Northwestern University — In this work we use fully resolved
fluid dynamics computations based on an immersed body approach to study fish
turns and maneuvers. We present a numerical method to control the trajectory of
fish during turns and maneuvers. Fish tracking a prey is presented as an example
case. Numerical simulations are carried out on spatially adaptive grid for speed and
accuracy. The effect of deformation kinematics and Reynolds number (Re), on the
turn radius of an undulatory swimmer, is studied. Power spent during turning at
different turn radii and Re is also reported. These results can be used to quantify
the cost of various maneuvers and to identify efficient maneuvers to attain the same
objective, e.g., reaching a target location during prey tracking.

Neelesh Patankar
Department of Mechanical Engineering, Northwestern University