1155-92-628 **Laura A Miller*** (lam9@unc.edu), CB 3280 Coker Hall, Department of Biology, Chapel Hill, NC 27599. *Flow through the hairy appendages of small animals: The leaky rake to solid plate transition.*

Numerous small organisms that swim, fly, smell, or feed in flows at the mesoscale where inertial and viscous forces are balanced, rely on using branched, bristled and hairy structures. Such mesoscale structures can augment underlying biological function (e.g., particle capture) by moving in a manner to transition from acting as solid surfaces to leaky/porous rakes at Reynolds number close to one. Although mesoscale flows have been studied in many organisms, the fluid dynamic mechanisms underlying the leaky rake to solid plate transition remain unclear, and robust mathematical models are unavailable. I will present results from numerical simulations and experiments that demonstrate how these transitions affect locomotion and exchange. Examples will include filtering flows through upside down jellyfish oral arms, airflows through bristled insect wings, exchange flows through corals, and sampling flows in crabs. In particular, the immersed boundary method will be used to resolve the flow through moving, flexible and porous structures. (Received January 22, 2020)