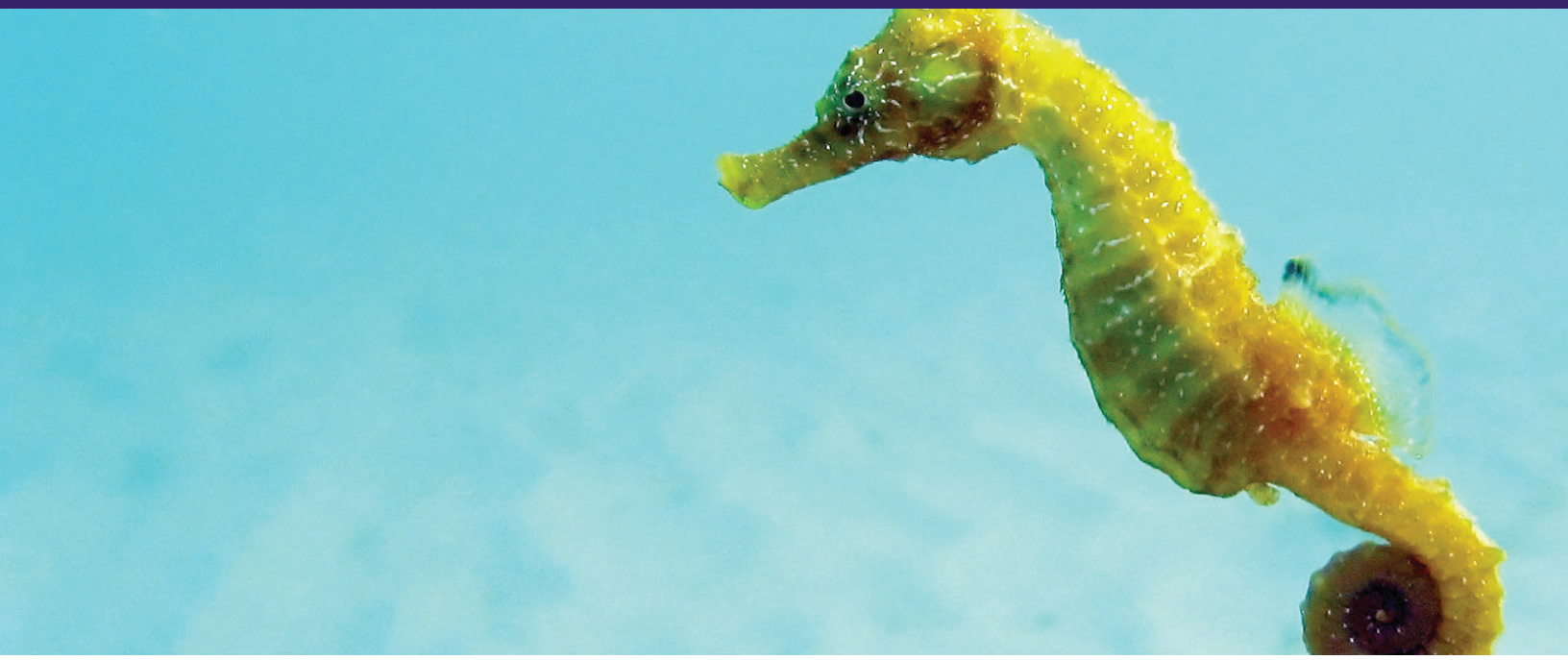
MSE 520: SEMINAR SERIES

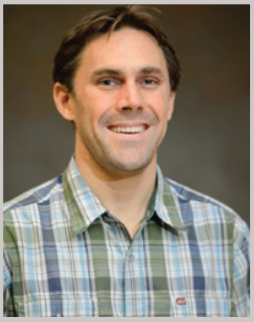
MATERIALS SCIENCE & ENGINEERING | AUTUMN 2016

4:30 PM | MONDAY NOVEMBER 7 | MUELLER 153



3-D-printing to Study the Biomechanics of Fish Tails

Modern prototyping methods, such as 3D-printing, provide convenient means to build reproducible physical models that mimic natural organismal designs for mechanical testing in controlled laboratory environments. Specific design modifications can be simplified or created to form idealized or hypothetical model systems with "adaptive" traits that can be individually tested and systematically compared. We use this approach to build "families" of biomimetic structures inspired by the tails of syngnathid fishes (seahorses, pipehorses, and pipefishes), which are compared to test hypotheses on the adaptive evolution of their skeletal systems. In this way, we subject the physical models to a variety of mechanical tests, quantify their response, and map their functional trade-offs. Upon comparison, it becomes clear how structural minutiae present in the tails of seahorses and related pipehorses provide them the unique ability to grasp.



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Michael M. Porter joined the Department in 2014 as an Assistant Professor after completing his Ph.D. in Materials Science and Engineering at U.C. San Diego. His research interests lie at the intersection of biology, materials science, and mechanical engineering. As an experimentalist working in the field of biomimicry, he studies selected natural systems (biological materials and organisms) to inspire, design and engineer new methods, materials, structures, mechanical devices and robotics. His work in bioinspired design aims to develop new technologies for use beyond their intended practical applications, as functional models to explore the morphology, material properties, biomechanics, and evolution of natural systems. He is a member of the Minerals, Metals and Materials Society (TMS), the Society for Integrative and Comparative Biology (SICB), and the Society for Experimental Mechanics (SEM).

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