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**Soft Snakes: Construction, Locomotion, and Control** CALLIE BRANYAN, TAYLOR COURIER, CHLOE FLEMING, JACQUELIN REMALEY, ROSS HATTON, YIGIT MENGUC, Oregon State Univ — We fabricated modular bidirectional silicone pneumatic actuators to build a soft snake robot, applying geometric models of serpenoid swimmers to identify theoretically optimal gaits to realize serpentine locomotion. With the introduction of magnetic connections and elliptical cross-sections in fiber-reinforced modules, we can vary the number of continuum segments in the snake body to achieve more supple serpentine motion in a granular media. The performance of these gaits is observed using a motion capture system and efficiency is assessed in terms of pressure input and net displacement. These gaits are optimized using our geometric soap-bubble method of gait optimization, demonstrating the applicability of this tool to soft robot control and coordination.

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