

Slender Structures: From Snake-like Robots to DNA Molecules

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In this talk the mathematical modeling of numerous slender structures from engineering and biology will be reviewed. This includes snake-like (hyper-redundant) robots that can maneuver through complex environments, semi-flexible polymer chains such as DNA, and flexible steerable needles for minimally invasive surgical applications. Common modeling tools are used for all of these problems. These involve the use of methods from group theory, differential geometry, and probability and statistics.