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High Throughput Fluorescence-based Force Spectroscopy of Single Molecule Interactions with DNA Origami Nano-springs[1] RANDY PATTON, CARLOS CASTRO, Ohio State Univ - Columbus — Biological movement and processes are ultimately driven by the interactions of singular biomolecules. However, only in the past few decades have techniques and been developed capable of probing these interactions at single molecule resolutions. The focus of this work is the development, characterization, validation, and application of a nanoscale device designed explicitly for fluorescence-based single molecule force spectroscopy, mimicking the function of traditional techniques at the nanoscale. The nanostructure comprises a stiff platform with attachment points for two biomolecules (a receptor and a ligand), a flexible single DNA linker that acts as an entropic spring, and fluorescent molecules to facilitate readout of the binding interaction via a FRET interaction. This device will enable the investigation of the kinetics and mechanical stability of biomolecular interactions and singular biomolecules in a highly parallel fashion. We have constructed the device and performed proof of principle experiments probing DNA base-pairing interactions.

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