ST. OLAF PHYSICS DEPARTMENT

X-rays and RNA: using scattering techniques to characterize highly flexible biomolecules

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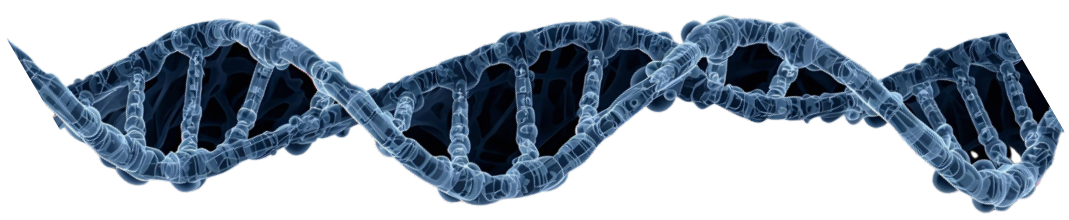

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IThe laws of physics apply to all objects, and small biomolecules like RNAs are no exception. RNAs are remarkably dynamic molecules capable of folding into intricate structures that enable their multiple biological functions. Synchrotrons produce incredibly powerful X-rays that can be used to probe the structure of these biomolecules. Small- and wide-angle x-ray scattering (S/WAXS) are well-established techniques enabled by synchrotrons and are widely-used by structural biologists. Our research pushes the limits of S/WAXS by integrating hand-fabricated microfluidic mixers to capture structural changes of flexible RNA ensembles on millisecond timescales. I will present on the engineering and fabrication of these highly precise microfluidic mixers, the ingenuity of synchrotron radiation, and how they are combined to reveal the folding pathway of a single-stranded RNA to a stable triple-helix