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Structural Color of Biological and Biomimetic Amorphous Nanostructures JASON FORSTER, HEESO NOH, VINODKUMAR SARANATHAN, HUI CAO, SIMON MOCHRIE, CHINEDUM OSUJI, RICHARD PRUM, ERIC DUFRESNE, Yale University — The feathers of many bird species have amorphous nanostructures of beta-keratin and air that produce non-iridescent color. These structural colors are the result of wavelength-selective scattering from nanostructures which have well-defined length scales but no long-range translational order. We quantify the optical properties of feathers with angle-resolved reflectance spectra and compare them to the nanoscale structures observed with X-ray scattering. We are exploiting self-assembly of polymeric and colloidal systems to create biomimetic nanostructures that capture the essential optical properties of bird feathers. By varying the characteristic length scale and index of refraction contrast of these structures we aim to enhance and tune wavelength selectivity.

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