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Monday–Friday, March 14–18, 2022; Chicago

Session N00: Poster Session II (11am- 2pm CST)

11:00 AM, Wednesday, March 16, 2022
Room: McCormick Place Exhibit Hall F1

Abstract: N00.00246 : De-tangling the Strength of the Rhinoceros Horn

← Abstract →

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The rhino population has dropped over 50% in the last 50 years due to poaching for their strong and durable horns. But where does this strength and durability come from? Unlike other animal horns, rhino horns do not have a bony core; instead, they are made completely out of keratin, the same material comprising nails, feathers and hair. The material properties of the horn thus arise solely from the arrangement of its keratin fibers. In this experimental study, we analyze the structure, orientation, and function the fibers play in this strength. We hypothesize that the structural integrity is built through entangled and intertwined fibers. Entangled and intertwined structures increase material strength evident by a nonlinear stress-strain relationship. We characterize the effects of the keratin's structural impact by performing mechanical, histochemical, and microscopy tests on a preserved Black rhinoceros (*Diceros bicornis*) horn. Through these tests, we have developed a "map" of the morphology and compositional differences of orientation and structure throughout the horn. Understanding the complete inner fiber structure will help build a rhino horn mimic to flood the black market with and thereby help reduce poaching.