

Robotic Luminous Seashells

Ali Farajmandi

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Dimensions: 30 x 30 x 30 cm (approx.).

Materials Used: Light

Description

My Robotic Luminous Seashells project explores the connection between natural forms and technology, inspired by the growth process of mollusks. Mollusks create their intricate spiral shells layer by layer, similar to 3D printing. Using computational modeling in Grasshopper, I translated the logarithmic spirals and geometric principles of shell growth—expand, rotate, and twist—into robotic motion paths.

To visualize these designs, I built an LED tool attached to an ABB IRB 120 robot arm, programming it to trace the shell's form. Through long-exposure photography, I captured luminous patterns in dark settings, stacking multiple 5-second exposures into single images. These radiant visualizations represent not only the shells' natural geometry but also the robotic precision in replicating them.

This project bridges art and science, creating visually striking compositions while exploring the conceptual possibilities of robotic fabrication and nature-inspired design.

Statement

The Robotic Luminous Seashells project reimagines the growth process of spiral seashells through robotic accuracy and artistic expression. Inspired by mollusks' natural shell formation, I used computational modeling to design geometric paths. Attaching an LED tool to a robot arm, I captured the dynamic spirals with long-exposure photography, creating luminous visualizations that celebrate the mathematical elegance of nature.

This work exemplifies the fusion of technology and organic design, emphasizing both aesthetic beauty and the innovative potential of robotic fabrication. It highlights how art and science can converge to transform and elevate natural forms in creative and meaningful ways.

Designer(s) Biography:

Ali Farajmandi is an architectural designer and CCA graduate with expertise in computational design and kinetic structures. With a foundation in Landscape Design and a Master's in Advanced Architectural Design, Ali combines creative problem-solving with technical precision to push the boundaries of architectural design. With experience at Autodesk Technology Center, he has honed skills in digital fabrication and transformable structures. Passionate about collaboration, he thrives in interdisciplinary teams, exploring the intersection of architecture and landscape to deliver innovative solutions. Ali's work focuses on reimagining spaces through adaptable, dynamic, and forward-thinking design approaches.

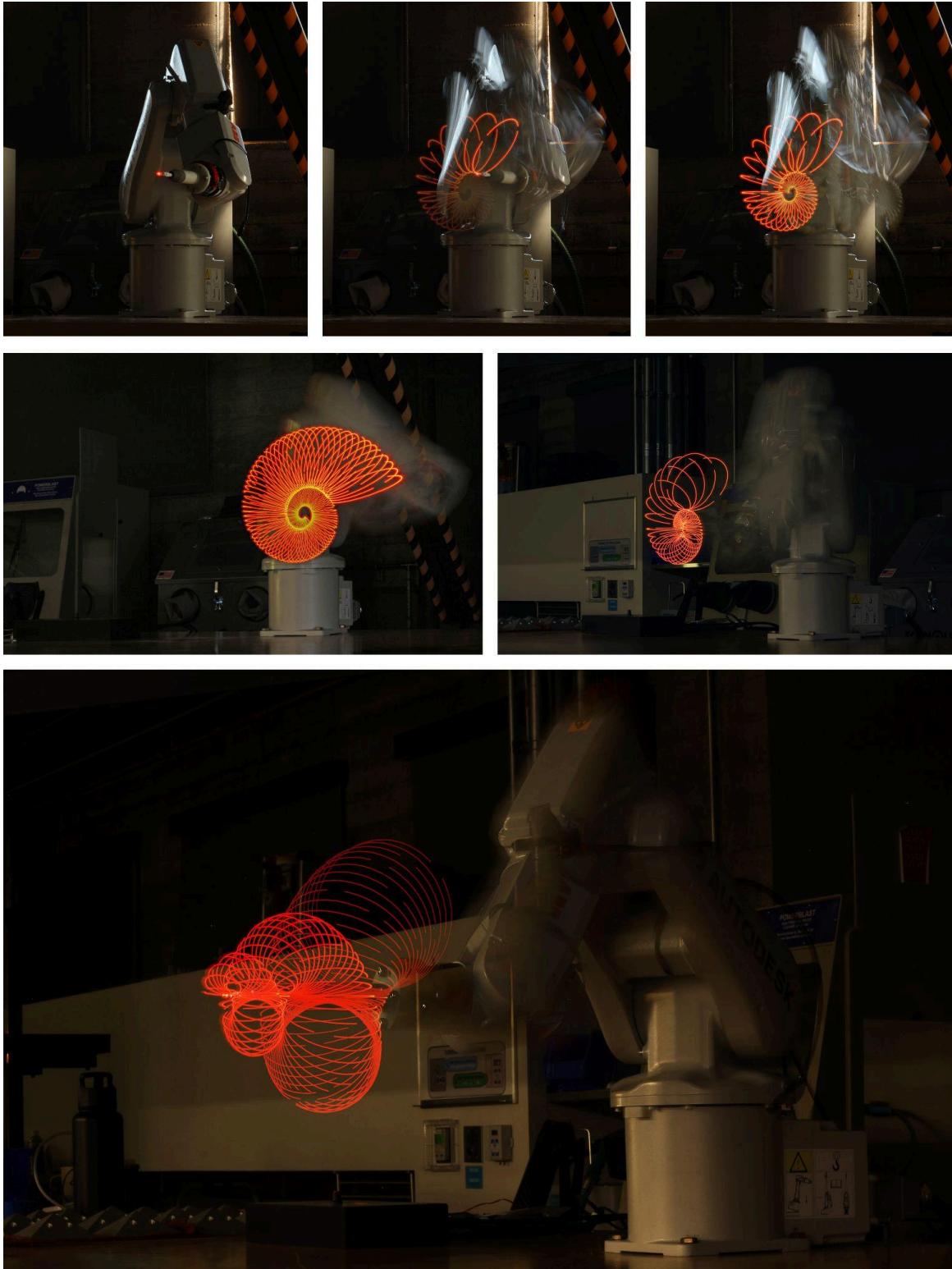


Figure. (Top two rows) Visualizations of spiral seashells constructed using the growth principles of Expand and Rotate. (Bottom) Visualizations created with a combination of Expand, Rotate, and Twist.