

# Science and Culture: Sculptures reproduce protein structures

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In Julian Voss-Andreae's recent work "Synergy," angular strands of stainless steel tubing cluster together, extending into the air like a metallic Lego braid. "Synergy," which Voss-Andreae says is "techy, but sensual," is an homage to collagen, our body's most abundant protein.

Collagen is a tough, flexible molecule that supports ligaments, tendons, cartilage, bones, and teeth. The molecule is a triple helix of amino acid chains, held together by hydrogen bonds. Collagen may be relatively simple in form for a protein yet, brought to life through stainless steel and

colored glass, it has a haunting, sophisticated quality.

In late September the just-completed sculpture was installed at Rutgers University to celebrate the new Center for Integrative Proteomics Research. "Synergy" also honors the center's founding director, Helen M. Berman, who determined the structure of collagen in the mid-90s. Berman has been interested in Voss-Andreae's work for many years and keeps an image of his 2006 sculpture "Unraveling Collagen" in her office.

To create his protein-based sculptures, Voss-Andreae begins with data stored at Rutgers's Protein Data Bank, enters it into a computer program he wrote, and receives, essentially, "instructions" for assembly. In "Synergy" miter cuts, joints of steel tubing cut at 45° angles, rotated, and welded together, stand in for the protein's peptide units.

"The essence of what nature does," Voss-Andreae says, "is take a one-dimensional [amino acid] strand and, by virtue of biophysics, turn it into a three-dimensional object, one that's critical for our life. We are doing basically the same thing here."

Voss-Andreae estimates his sculpture is structurally accurate beyond two orders-of-magnitude, although that is his measure of success. "For a research institute it's nice to have a piece that is so precise and that 'makes sense' in a way," he says. "But that's not what it is about. My accuracy is to get the feeling right."

Before moving into sculpture, Voss-Andreae studied physics, mathematics, and philosophy, specializing in quantum physics. Voss-Andreae credits his scientific training with helping him work as an artist. Physics taught him to divide large problems into smaller ones. "I have learned to see what I need to know in order to solve the sub-problems," Voss-Andreae says. "And I learned how to get into a new field and figure it out while keeping in mind what I want to do with it." Given his style of work, the math, engineering, and computer skills also come in handy.

"But my background doesn't only allow me to arrive at what I envision, it also influences my vision," says Voss-Andreae. The imagery of science is a source of inspiration as well as the scientific quest itself.



Voss-Andreae installs "Synergy" at the Center for Integrative Proteomics Research, Rutgers University. Image courtesy of the artist.