



CASE STUDY
POLYJET

Transforming Data into Art with **GrabCAD** **Print Pro™** and **Voxel Print™**





A Visionary's Perspective

The European Commission's Joint Research Centre has forged a pioneering partnership to make water extent data freely accessible and policy friendly. This initiative empowers citizens and governments to easily evaluate the state of global natural resources, starting with water.

Ingrid Mayrhofer-Hufnagl, an accomplished architect with a PhD from the University of Innsbruck, has always been passionate about merging scientific precision with artistic expression. As an external expert for the European Commission, Ingrid collaborated on the "Global Surface Water Dynamics" project alongside Scientist Alan Belward, Luca de Felice and Jean-Francois Pekel. Their work challenged traditional data representation, blending art and science in innovative ways.

"We wanted to communicate scientific facts in a way that evokes empathy and understanding," Ingrid recalls. "How could art influence policymaking, and what difference could it make?"



Navigating Uncharted Waters

Ingrid was already familiar with 3D printing, but nothing matched the precision and resolution offered by Voxel Print™. Ingrid and her scientific collaborators faced the challenge of visualizing decades of satellite imagery and Earth surface data spanning over 40 years. The sheer volume of data was staggering and translating it to a 3D format seemed nearly impossible.

"When we first saw what Voxel Print could do, it was a revelation," says Ingrid. "We could print directly from our stack of images without converting them into 3D geometry first. No other technology allowed us to visualize this data in such extraordinary detail."

The process was painstaking, requiring months of data preparation and testing. The team had to master the intricacies of RGB in three dimensions, a new task for them.



We needed to understand how colors behaved in 3D space, It was both a challenge and a fascinating journey."

Ingrid Mayrhofer-Hufnagl
Assistant Professor of Architecture
at University of Innsbruck



3D printed sculpture
of Earth's surface
transitions with 3D
printed stand



A Breakthrough Solution

The solution lay in transforming 2D scientific maps into vibrant 3D models. Using an algorithm to map the inner gradient of colors, the team materialized volumetric data using multi-material PolyJet™ technology and the transparency features of Voxel Print™ within GrabCAD Print Pro™.

“By using VeroClear and VeroUltra™ White materials, we achieved an unprecedented level of precision,” Ingrid states. “The small pixels and intricate details of the data were brought to life. VeroVivid’s ultra transparency added another layer of depth, making the effects even more pronounced.”

The innovative approach allowed the team to visualize transitions in Earth’s surface data over four decades. “It was thrilling for the scientists to see their data in 3D,” Ingrid recalls. “They were used to 2D representations, but this brought their work to life in a way they had never imagined.”

This technology enables the creation of 3D printed architectural models, setting a new benchmark in architecture 3D printing.



Close up of 3D printed sculpture of Earth’s surface transitions

A Lasting Impact

The team designed four models that have been exhibited by the European Commission JRC SciArt Project Resonances IV NaturArchy, each capturing a unique story of Earth’s surface changes over 40 years. These models provide a breathtaking view of how water bodies and rivers have evolved, revealing details that even high-resolution satellite images miss.

“Visitors can use a torch to see the colors change, experiencing 40 years of Earth’s history in 3D right before their eyes,” Ingrid says with excitement.

The implications of this technology extend far beyond visualizing data. “This has the potential to revolutionize architecture and construction,” Ingrid asserts. “We can now create architectural models with varying stiffness, colors, and transparency, something that was previously unimaginable.”

Education in architecture is also poised for a radical transformation. “Everything we’ve taught for the last 200 years is becoming obsolete,” Ingrid remarks. “Descriptive geometry is no longer needed when we can print image data at a resolution that even computers can’t process.”

Ingrid is continuously impressed by the technology and the collaborative efforts of the team. “Visiting StratasyS was an eye-opener,” she concludes. “It broadened my understanding of 3D printing in architecture and inspired countless new ideas for future projects.”

Through this journey, the Joint Research Centre (JRC) of the European Commission has not only redefined data representation but also set a new standard for how art and science can intersect to create meaningful and impactful visualizations.





Pioneering the Future of 3D Printing and Architecture

The use of the J850™ Prime 3D printer for architectural models exemplifies a groundbreaking shift in how 3D printing for architecture is perceived and utilized. Ingrid and her team's work with GrabCAD Print Pro™ and the Voxel Print™ feature has illuminated new pathways in 3D printing and architecture, demonstrating the potential for these technologies in the field.

By embracing this innovative technology, the team has shown that the future of architecture lies in the ability to create complex, detailed models that seamlessly blend artistic vision with scientific accuracy. This paradigm shift in 3D printing and architecture promises to redefine the boundaries of what is possible, heralding a new era of creativity and precision in the field.



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