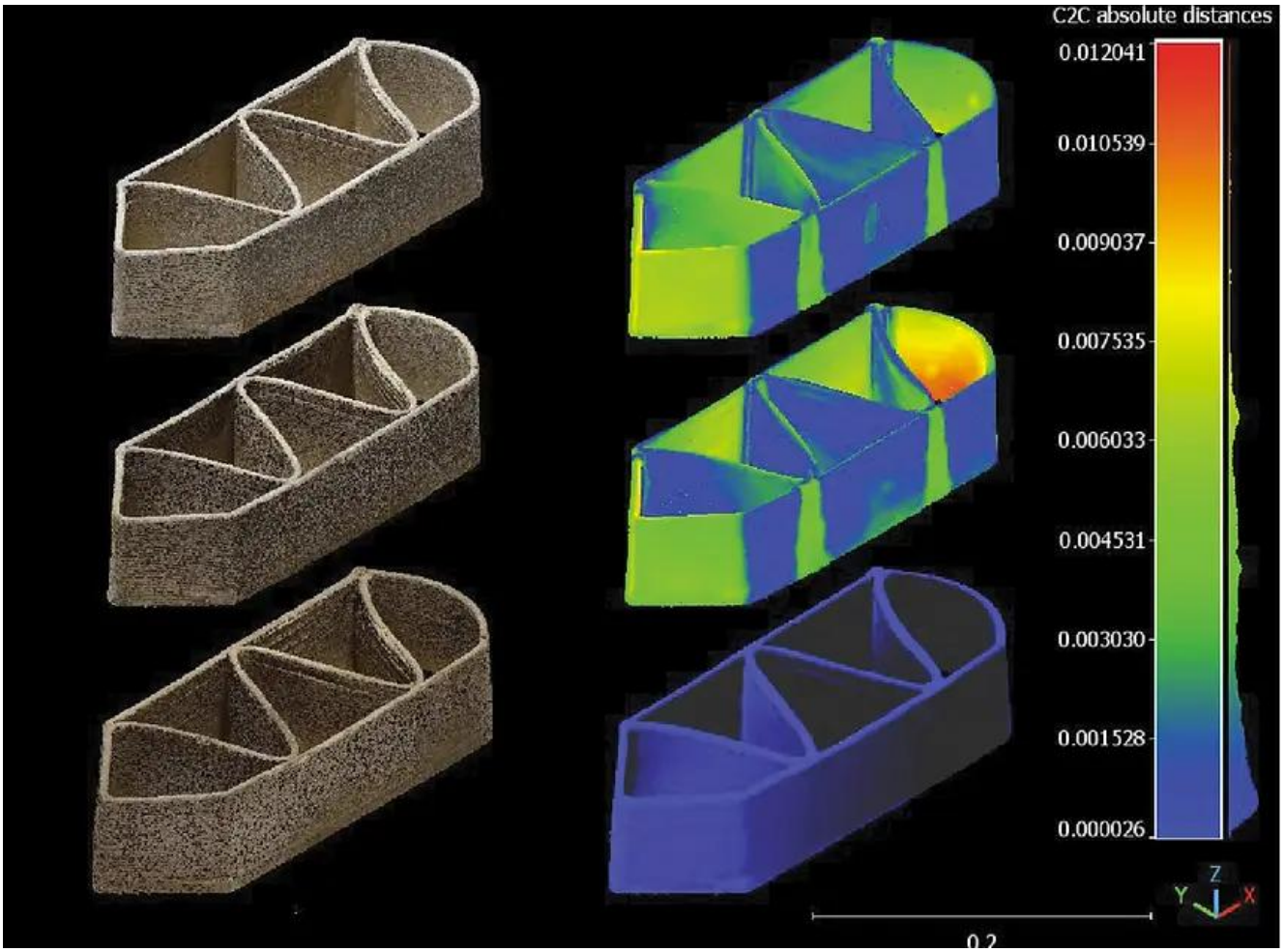
Predictive Precision in 3D Printing Through AI

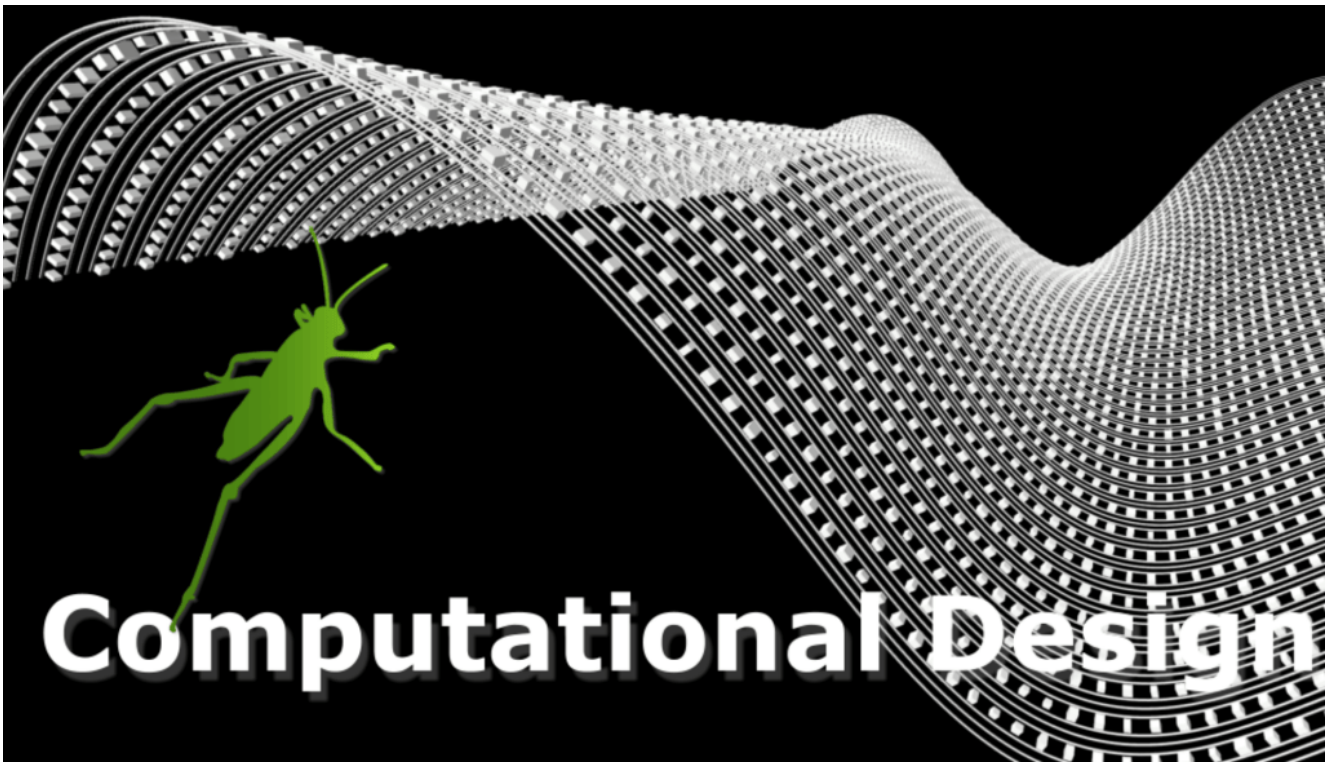
Neelam Chellani's master's dissertation at UCL delves into the realm of 3D printing, focusing on the pivotal aspect of shrinkage prediction, which is vital for achieving optimal dimensional accuracy and efficiency in manufacturing. Under Professor Sean Hanna's guidance and with Marcin Kosicki's technical expertise, Chellani embarked on this academic journey.



The core objective of her research was to refine the prediction of deformation in clay 3D printing by leveraging convolutionally-equipped cGANs. By adapting methodologies from previous studies, Chellani aimed to explore machine learning's capability to anticipate deformation in 3D-printed clay objects, particularly when represented as binaryoccupied voxels.

Chellani's work holds immense potential to revolutionize 3D printing processes, fostering innovation in design possibilities across various

industries. Her approach extends beyond clay materials, encompassing a spectrum of substances like polymers, metals, ceramics, and biomaterials, opening up a world of possibilities for the future of 3D printing.

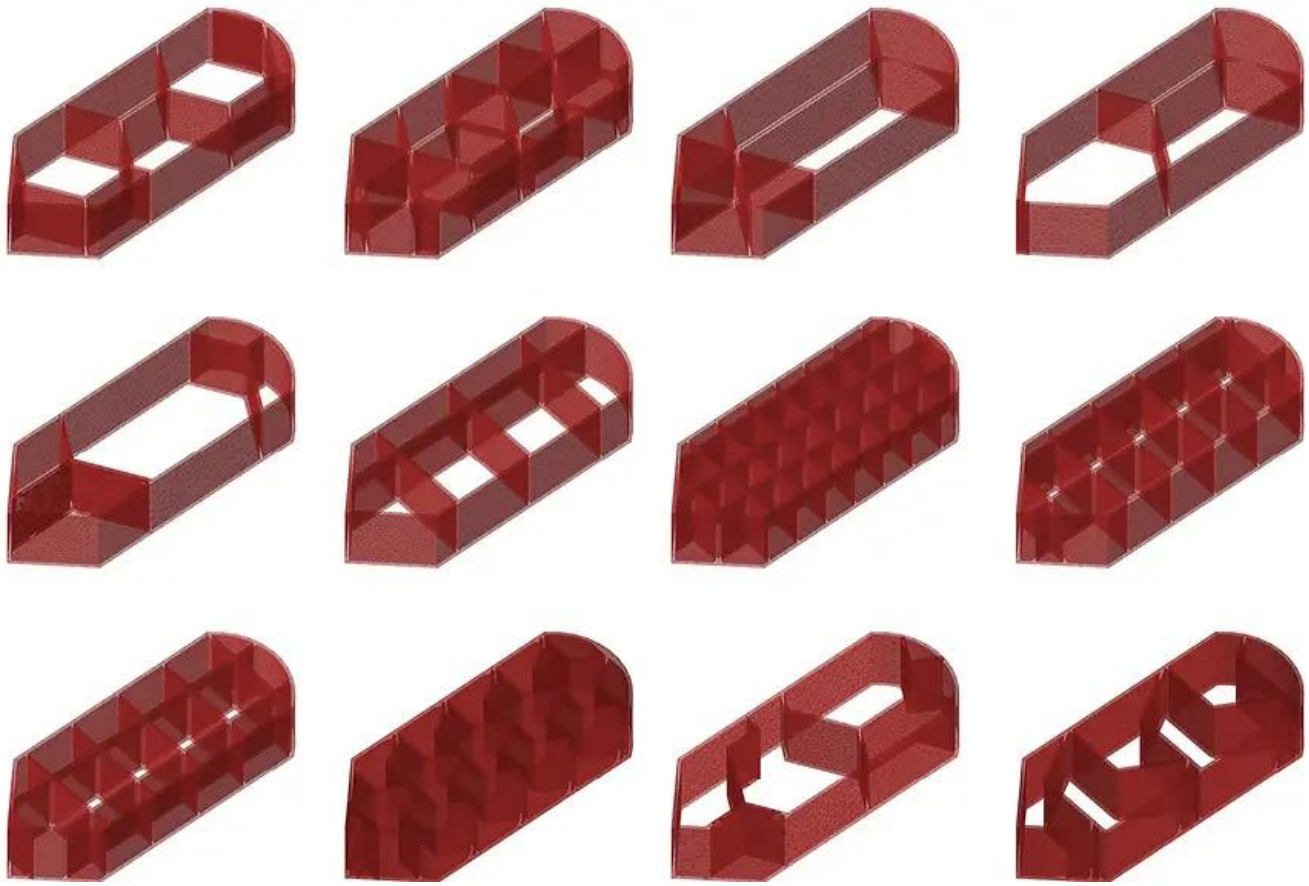


See Also

COMPUTATIONAL DESIGN WITH GRASSHOPPER

Noteworthy are the tools and plugins instrumental in streamlining Chellani's processes. Grasshopper, coupled with the Kangaroo plugin, facilitated experimentation with object shapes and simulation of output datasets. Moreover, Grasshopper proved invaluable in generating geometry datasets, a crucial component for machine learning models.

Throughout her project, Chellani encountered and successfully surmounted challenges, employing a meticulously structured methodology spanning six key phases. From geometry exploration to machine learning model implementation, each phase contributed to the project's success.



Chellani’s research marks a significant stride in the convergence of architectural design and cutting-edge technology. She contributes to a new era of precision manufacturing and design innovation by advancing shrinkage prediction. of innovative design methodologies, seamlessly blending parametric modeling techniques with traditional craftsmanship.

As a symbol of ingenuity and collaboration, it serves as a beacon of inspiration for future architectural endeavors.sign and seamless integration of digital tools.