

Shifting Datum: A Critical Inquiry into Coastal Change

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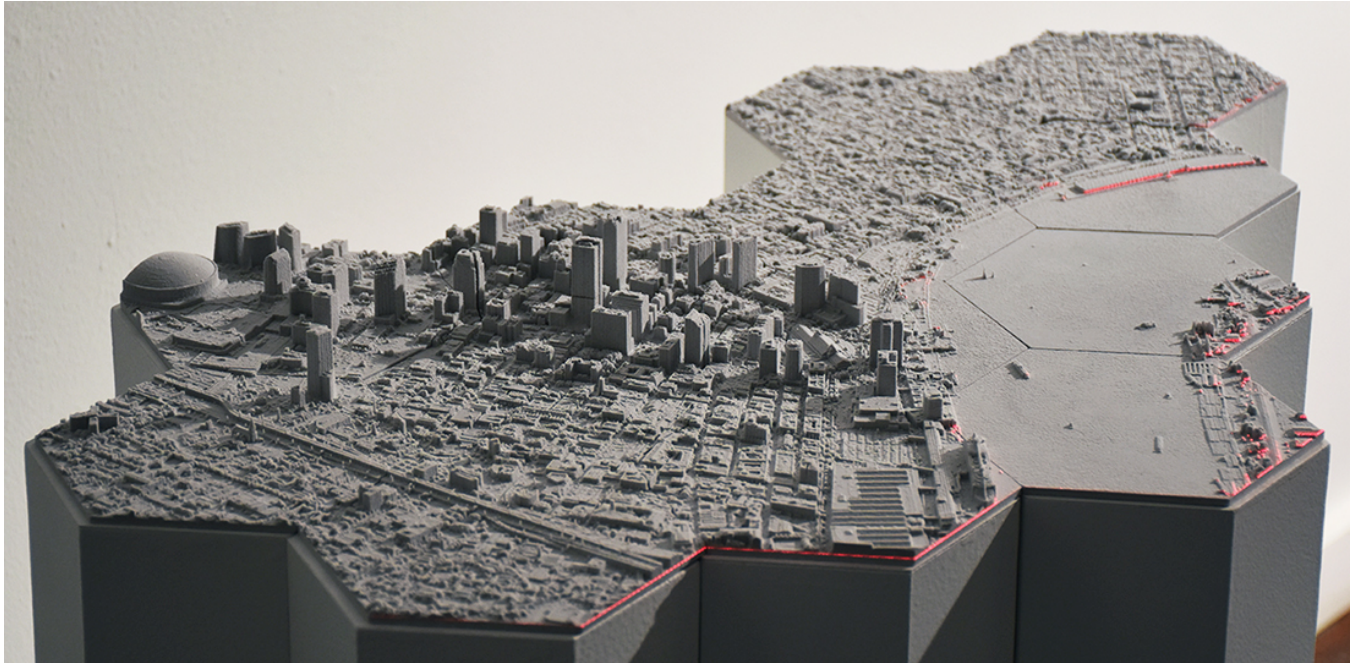


Figure 1: Shifting Datum

ABSTRACT

Shifting Datum is an installation that critically examines the relationship between New Orleans – a city much of which is at or below current sea level – and changes in relative sea level. With the increasing interest among the artists and designers on how to integrate research into their practice, we present Shifting Datum as a critical inquiry speculating on environmental issues such as rising sea levels. This paper introduces the recent movement of speculative design, frames Shifting Datum as a critical lens for inquiry into the near future, and describes the process of developing and fabricating the installation.

*Both authors contributed equally to this research.

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CCS CONCEPTS

• **Human-centered computing** → **Visualization**.

KEYWORDS

Cities, climate change, digital fabrication, narratives, sea level rise

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1 INTRODUCTION

Artists, activists, and designers have often identified problems, criticized the status quo, and suggested alternative solutions through their practices using artwork, installations, artefacts, or design prototypes. For example, Chinese contemporary artist Ai Weiwei created an installation, *Remembering* (2009), made of nine thousand children's backpacks installed on the facade of the museum in Munich [6]. His installation aimed to criticize the lack of public information transparency during the Sichuan earthquake in

2008 and to remember the children lost from the disaster. Similarly, Mexican-Canadian artist Rafael Lozano-Hemmer developed his artwork, *Level of Confidence* (2015), to memorialize 43 Mexican students who were kidnapped [5]. To raise awareness and commemorate the students, the installation matches the faces of the audiences with those of the students using facial recognition technology. Likewise, the design duo Anthony Dunne and Fiona Raby presented *Foragers* (2009) to suggest a creative solution for future food shortages [3]. In *Foragers*, people adapt to food shortages with digestive devices for algae or plants. Artists and designers like Dunne and Raby and James Auger from the Royal College of Art [1, 2] actively use design fiction and speculative design in their projects to provoke ideas and stimulate discussions about possible technological futures, whether desirable or undesirable. The aim of critical inquiry is to explore potential futures. The future cone, as illustrated by Dunne and Raby, categorises potential futures as probable, plausible, possible, or preferable [4]. Within this context, *Shifting Datum* – a visualization of sea level rise projections for the city of New Orleans, Louisiana – uses critical inquiry to ask questions and raise awareness about coastal change. *Shifting Datum* prompts people to think of a probable, near future when New Orleans is no longer inhabitable due to climate change, rising sea levels, and land loss.



Figure 2: Shifting Datum installation

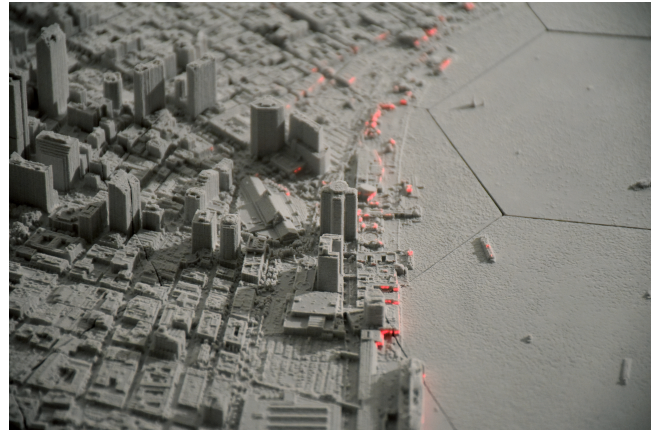


Figure 3: Close-up view of Shifting Datum

2 IMPLEMENTATION

Shifting Datum (see Figure 1-3) consists of 3D printed tiles forming a model of New Orleans, a linear actuator with a laser that is controlled and motorized by an Arduino microcontroller, speakers that play audio recordings of interviews, and directional lights mounted on hexagonal pedestals. The 3D printed tiles of the city were modeled in GRASS GIS and Rhino from the U.S. Army Corps of Engineers 2012 Lidar Survey of New Orleans ¹. *Shifting Datum* uses a laser line to mark the rising datum of sea level. A laser moved by a linear actuator casts a red line across 30 plaster models of New Orleans printed with a ZPrinter, marking the projected change in relative sea level. The laser line moves vertically up or down every minute to visualize 100 years of coastal change (see Figure 4). Meanwhile the audience can listen to stories from local residents who live on the disappearing coast of Louisiana.

Shifting Datum is also an interface for storytelling. Audience will listen to short interviews from coastal residents of Louisiana who are gradually losing their land. These interviews have been published in the podcast *Coastal Voices* ². Some of the narratives are personal stories about how coastal change has influenced their everyday life and some of them are painful reminiscences of catastrophic experiences with floods and hurricanes. Many of the narratives tell of the fundamental relationship between people and their environment. This excerpt from an interview with one of residents, Mr. Windell, is an example:

My grandfather told me of the hurricane of 1893. He was born February 1st, 1893. So he was repeating a story that his father told him. When I was growing up, this area to be an adult was to speak French, and he told me the story in French. And basically 1700 people lived in Cheniere Caminada. The hurricane of 1893 hit, destroyed half the population, 700 people killed that one night. Cheniere Caminada was right on the coast of Louisiana. The survivors from the hurricane of 1893 moved to LeeVille and what's left is basically you have cemeteries and those cemeteries are sinking.

¹<https://coast.noaa.gov/lidar/viewer/v/noaapotree.html?m=6350&g=geoid18>

²<https://soundcloud.com/louisianacoastalvoices>

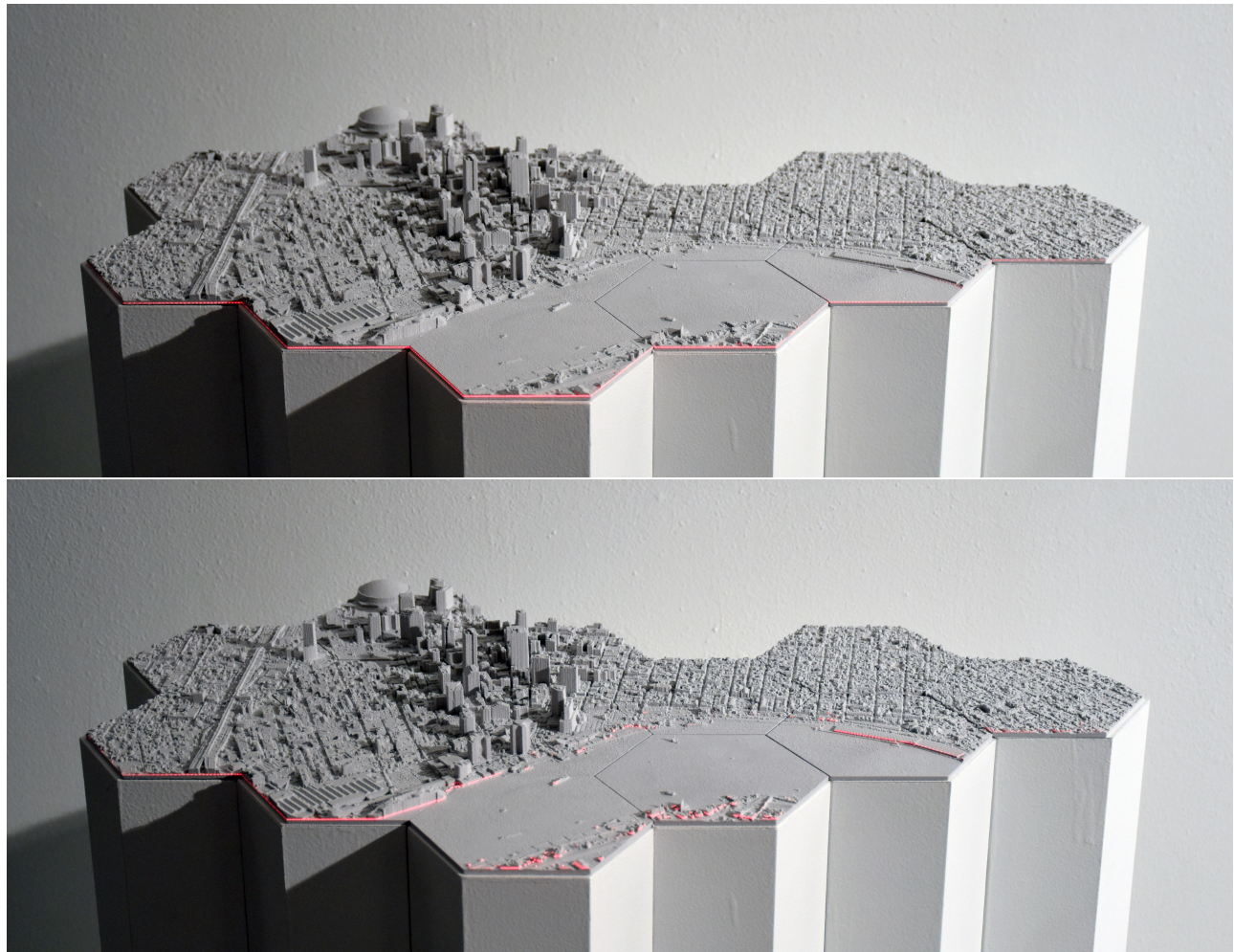


Figure 4: Shifting Datum with a laser line representing relative sea level rise

So this is a place where even cemeteries die. When you lose a community, I mean not just houses, just not the people, but even the landmass that it's on, you lose your future and you lose your past.

With vibrant storytelling from the residents who have experienced land loss, *Shifting Datum* becomes more engaging and immersive. Light, voices, stories, and the model form multiple sensory layers. As the audience listen to intimate stories about residents' relationship with disappearing lands, we hope they will think about the past and the future of New Orleans.

3 CONCLUSION

Shifting Datum acts as a speculative lens for examining a probable, dystopian future. Through interactions with *Shifting Datum*, we hope our audience will become more mindful of the environment and think about how to coexist with nature. Through *Shifting Datum*'s critical inquiry into a city's precarious future, we show how creative artwork and design artefacts can act as both research and discursive process.

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