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SONIFICA – The New Bionic

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Abstract

SONIFICA explores the notion of the Enhanced Body, turning the human body into an instrument by way of technology. It represents a new type of sonic spectacle where the architecture of the body is enhanced with 3D-printed devices that augment the performer's capacity.

Keywords Trans-disciplinarity; Enhance; Sonic; Instruments; Prosthetic.

INTRODUCTION

SONIFICA explores the notion of the Enhanced Body, turning the human body into an instrument by way of technology. It represents a new type of sonic spectacle where the architecture of the body is enhanced with 3D-printed devices that augment the performer's capacity.

The experimental integration of architecture and music by means of advanced computation and digital fabrication unlocks new potentials for collaboration between different disciplines to be applied to the scale of the human body so as to generate a leading-edge type of synthetic, prosthetic design. The collaboration between different disciplines applied to the scale of the human body can generate a leading-edge type of synthetic design assimilation that questions existing models of representation, stretching the limits of architecture by opening it up to the field of spatial-sensorial composition. The overarching project aims to design and fabricate Sonic Architecture artifacts to function as catalysts for new sensorial experiences, turning the body into an instrument. As architecture and music merge, they create new spatial possibilities for artistic performances and a new model of trans-disciplinary integration is proposed via the creation of immersive, technologically driven spectacles.

METHODOLOGY

The experimentation consisted of performances by bionic pop artist Viktoria Modesta and the MONAD 3D-printed Sonic Ensemble during Art Basel Miami 2016 at New World Symphony auditorium, and also using Zaha Hadid's 'Elastika' installation at The Moore Building as stage. A design collaboration of MONAD Studio| Eric Goldemberg + Veronica Zalcborg with fashion-tech designer Anouk Wipprecht, Sonifica is a hybrid ideology conceived around 3D printed interactive instrumentations focused on the taxonomy-network of Art, Technology and Architecture.

Following a voluntary below knee amputation and progressive work with MIT Media Lab and Popular Culture, Viktoria invokes a new genre where science, art, and fashion collide into spectacular aesthetic eccentricity; thus redefining and transcending the body into an art concept where body, 3D-printing and sonic sculptures are mixed to define a new, synthetic Spectacle.

FEEDBACK: ARCHITECTURE + MUSIC

Feedback implies a mutual inflection of active bodies in a conductive milieu – an awareness of perception related to movement that can become an enigmatic relationship between space, body and rhythm. There are corporeal consequences of feedback in architecture that naturally extends from the scale of the body to the atmosphere of space, defining its character and allowing for measured experiences to percolate through our collective engagement with it.

Sonic artifacts are prostheses, extensions, objects or systems that integrate the body to mutate its aesthetic and functional potential. SONIFICA aims to push this vision of feedback to its limit, fostering a reflection on the evolution of the human, its symbiosis and conflict with technology in possible futures.

Through collaborations with musicians, architects, and interactivity designers the team has been able to develop projects that add more dimensions and qualities to the perception of space; their sonic installations and 3D printed music instruments activate relations that define new possible applications for architecture as a medium for the transmission of sensations. Aural, visual and tactile senses are activated by the morphology of their pieces, generating a network of social interaction that augment the role of architecture from background to active fodder for sensory activity.

They stage the conditions of form, program and atmosphere so that sound can be produced and received as spatial experience with particular consideration for notions of posture, playing habits and the necessary ergonomic adaptations to improve existent music instruments and create new, unprecedented ones.

3D-PRINTED MUSIC INSTRUMENTS

Focusing on how the taxonomy of sound can provoke the senses, for the design of the sonic bustier and prosthetic leg the team began by applying the same methodology used previously by MONAD Studio on their 3D-printed music instruments, analyzing the ergonomic relationships between musicians and their instruments via digital mapping of their posture during performances. This dynamic re-conception of the prosthetic structure of sonic artifacts based in the movements of the performer laid the foundation for the development of the architecture and emergent aesthetics for Viktoria Modesta's body, incorporating seamlessly Anouk Wipprecht's interactive gadgets into the morphology of the bustier, tusks and leg to generate a novel spectacle. Precise 3D modeling allowed for the optimization of the points of friction between body and instrument so that new capacities for the production of sound could be engineered using interactive devices and malleable geometries adaptable to the supple topology of the body to establish a new kind of design intelligence. This fusion of sensibilities enabled multiple technical constraints to be incorporated seamlessly as rules that helped to calibrate the design through the various 3D-printed iterations. MONAD

Studio's interest in tackling this very physical experience at the scale of the human body is coupled with design morphologies that further evoke rhythmical, intensely sonic pulses in order to create tension between the musician's postures and the prosthetic musical instruments.

The music instruments by MONAD Studio motivated by harnessing sonic mayhem through three-dimensional form represent a radical shift in practice; a move towards the creation of material environments that cultivate feedback. A reciprocal relation between subject and object motivated by the enhancement of rhythmic moods in the perceptual field, this technique adopted from the sonic world unlocks new potentials for design to engage directly with the ever-changing postures of the human body. The contribution of the sonic dimension to an architecture of moods is exemplified by the interest of MONAD Studio in coalescing the physical sensations of the experience of music with the precisely shaped and scaled profiles of their artifacts that became highly charged functional and aesthetic extensions of the body; creating an entirely new domain of design where architecture and music intersect to engender enigmatic objects of projective desire and evocative thrust.

The intimate space surrounding the body is the most immediate concern for this new domain of design. Mood emerges from the oozing sensations enacted by provocative prosthetic adaptations, leading to innovative modalities of performance encoded in enigmatic, yet precise sonic architectures.



FIGURE 1: In this performance at The Moore Building in Miami, Viktoria Modesta was supported by an ensemble of five musicians playing 3D-printed music instruments designed. Source: authors.

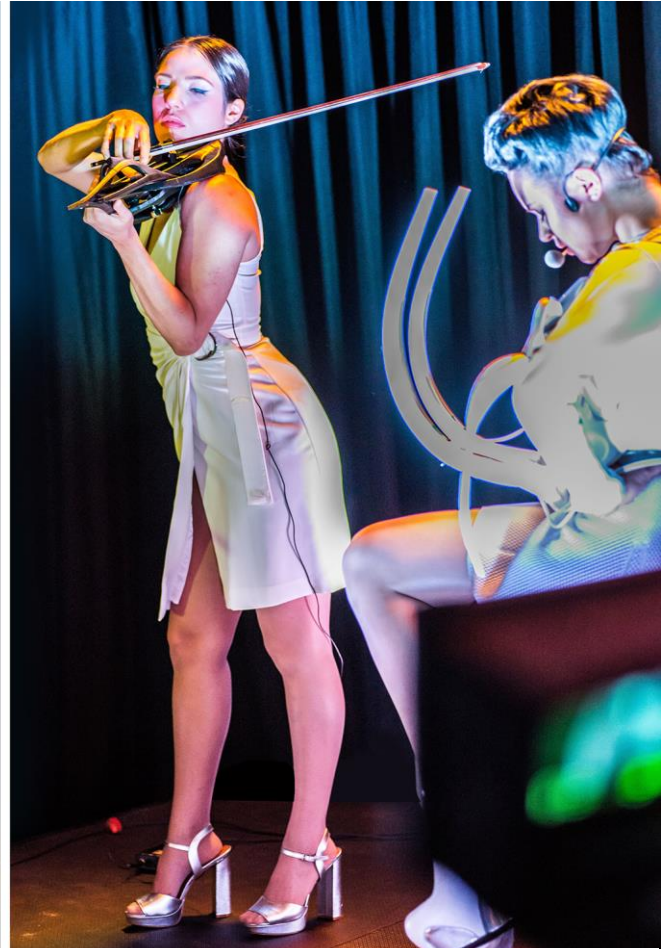


FIGURE 2 – Bionic pop artista Viktoria Modesta performing live at New World Symphony during Art Basel Miami, accompanied by two violinists playing 3D-printed violins by MONAD Studio | Eric Goldemberg + Veronica Zalberg with musician-luthier Scott F. Hall



FIGURE 3 – The 3D-printed violins, Sonic bustier and prosthetic leg with accelerator create a new kind of immersive hybrid, techno-spectacle

RESULTS

The audio-visual spectacle of MONAD's sonic ensemble of 3D-printed instruments is augmented live with a series of Microcontroller infused playable artifacts meant to question existent sonic structures. Viktoria's new accelerometer-based prosthetic leg and the bustier with sensor-based 'tusks' do not conform to normative instruments; these pieces are created to explore new realms of interfacing with sounds using the spaces around the body through architecture and interaction design, engendering new forms of performance and expression. The system uses open-source hardware. The interactions are Arduino based connected to FRS sensors and accelerometers. This allows Viktoria to create, modulate, and modify sounds by forcing physical pressure by squeezing, tapping, moving or sliding her fingers on the touch-sensor sliders located on the inner part of the 'tusks' that emerge from the 3D-printed bodice designed for her torso. Together with producer Madeaux Viktoria

created pre-designed samples in Ableton to be broadcast by the system.

Viktoria Modesta challenges people's perceptions of limiting disabilities and the impact of this on our social status by redesigning possibilities for the body. As an amputee, she has been able to turn her bodily constraint on its head. For the SONIFICA project, her performative capacity was augmented by a 3D-printed sonic bustier designed by MONAD Studio and Anouk Wipprecht with tusks equipped with sensors and actuators that allowed her to modulate sound during live performances. Along with a new prosthetic leg, furnished with an accelerometer, this allowed her to become a living music instrument and to interact both spatially and sonically with an ensemble of musicians playing MONAD Studio's 3D-printed music instruments.

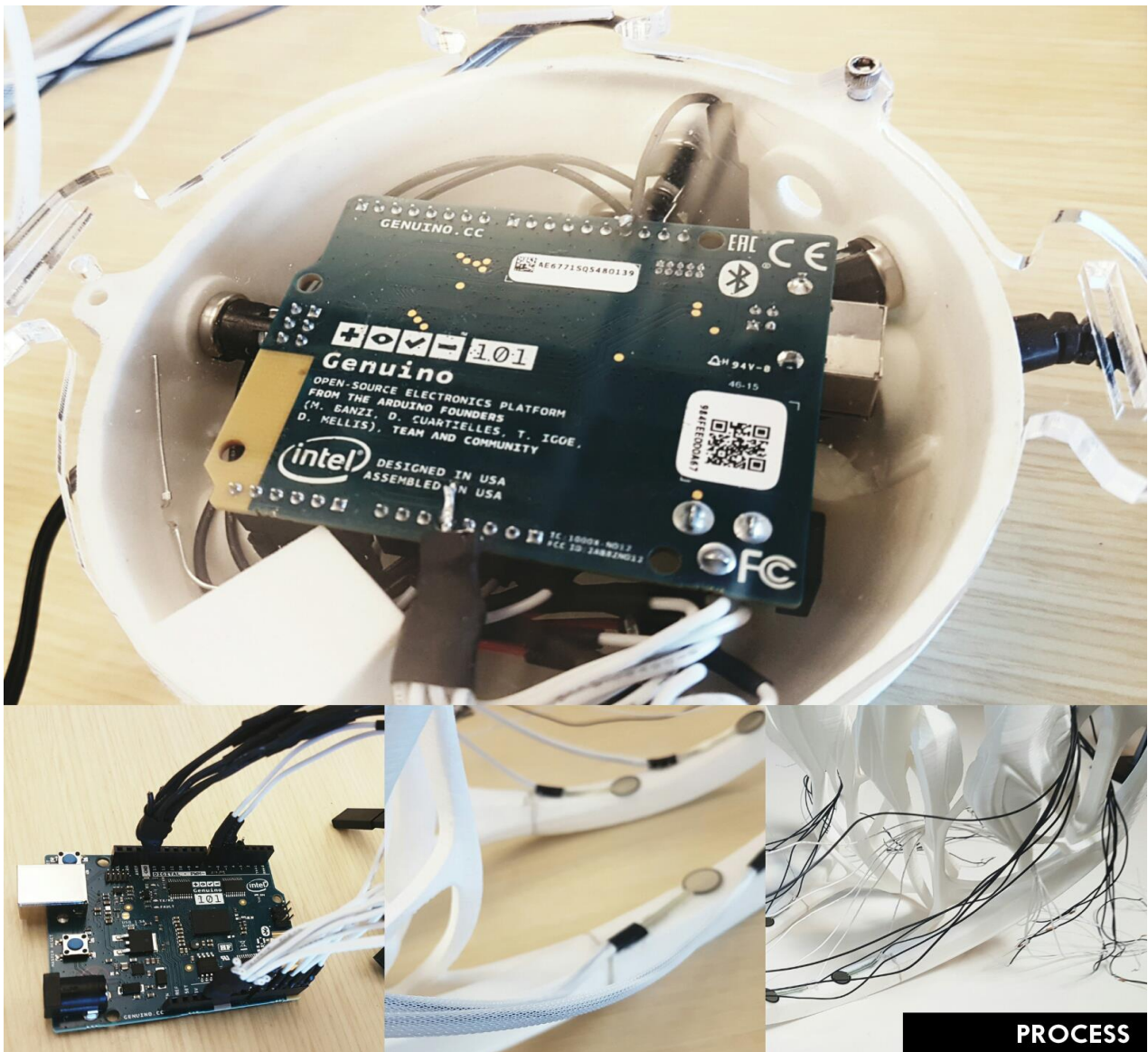


FIGURE 4 - The 3D-printed sonic bustier has long, protruding tusks equipped with sensors and actuators that allow Viktoria Modesta to modulate the sound of her live performances. Both pieces use open-source hardware and software, embedded with a compute module that recognizes gestures, and a six-axis accelerometer and gyroscope to track movement. Source: authors.



FIGURE 5 - The exploration of the ergonomics of the human form and the expression of the instrument were particularly evident as the protruding tusks were situated right in front of the musician's hands for an easy grip of the interactive buttons and slider that controlled the sound.

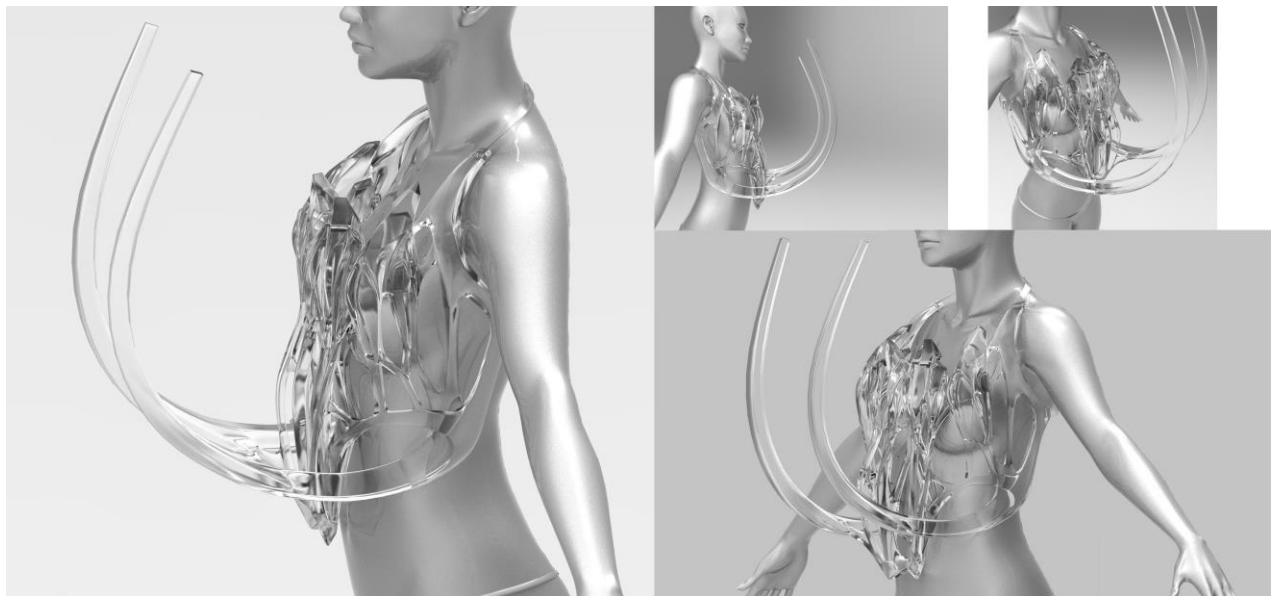


FIGURE 6 - The sonic bustier was customized to shape its fluid architectural components around the performer's specific postures, allowing for the necessary freedom of movement and enhancing the capacities of the body. Source: authors.

The premiere took place in the Miami Design District, in the atrium of The Moore Building, with Zaha Hadid's *Elastika* installation as part of the stage set. The project is one of many possible examples of technology and creativity combined with the human will to exceed limitations and produce new meaning, intensifying some fundamental existential questions. It was followed by a second performance at New World Symphony's main hall during Art Basel Miami 2016, this time restricting the

performance to Viktoria Modesta equipped with the sonic bodice and an interactive, prosthetic leg; she was accompanied by two violinists playing MONAD Studio's 3D-printed violins and DJ.

CONCLUSIONS

The synthesis of aesthetic, functional and spiritual power sparked by architects MONAD Studio with interaction designer Anouk Wipprecht and bionic pop artist Viktoria

Modesta in the live performances of SONIFICA throughout 2016 generated a new mode of alliance beyond disciplinary boundaries. Supported by the Florida International University Department of Architecture Department of Architecture, the interdisciplinary team was able to find common ground in the sonic world as medium, and the human body as artistic subject, creating new design dimensions geared towards innovative ways of social engagement through sensation, emotion and healing. The fusion of the different capacities of each of the collaborators elevated the challenge to unforeseen organisations of matter that revealed how much can be achieved by entangling our sensibilities and experimenting with spatial perception.

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The project evolves a growing field of experimentation pioneered by performance artists like Stelarc and Steve Mann whose contributions to an enhanced aural relation to space and time set a profound precedent for this team's interest in experimentation with augmented rhythmic sensations. Rhythm is a natural, instinctive guideline for interesting morphologies, shaping sensations that bring out a raw primitivism, a fundamental energy that has the capacity to move people, heal and nurture new possible forms of art where sound, vision, touch, space, fashion, architecture, couture, sculpture and theatrics are fused by the instinctively sophisticated approach to pulsatile form.

The way the project has evolved represents a more open approach, shaped not by any specific domain or discipline, but rather by a collective impetus that demonstrates a new mode of expression, a new type of art that is inclusive of architecture, design, fashion, engineering, interactivity and sonic performance; where projects emerge according to the collective intent of trans-disciplinary sensibility, and not the other way around.

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