

## Community, Interdisciplinarity, Reflections and Projects (CIRP)

### Call for Art Projects 2023

#### A – General Information

Group #

Group 1

Project title

Harmony in Disarray: Nature's Song Interrupted

Acronym

HINDSI

Keywords (5)

Interdisciplinary, Multimedia, Gene Music, Nature

Team members

| Names   |           | Fields of interest, expertise, contribution to the project  |
|---------|-----------|---|
| Stella  | Vanne     | <b>Learning Science, Engineering Education</b><br>Contribution - Collage Planning & Realization   |
| Ziqi    | Yi        | <b>Life Science</b><br>Contribution - Gene Sequence Music Planning and assist in collage  |
| Emma    | Melotti   | <b>Chemistry and Microbiology</b><br>Contribution - Looked for pictures and material online to pick for the collage and helped in the realization of collage  |
| Sochima | Aneke     | <b>Digital Science</b><br>Contribution - Technical Master for Wood Cutting, General Help with Everything  |
| Tom     | Lorthios  | <b>Life Science</b><br>Contribution - Find pictures corresponding to different thematic related to our topic. Participate in the genome music ie choosing the specific sequence and the method to use it as input for the code. |
| Romaric | Sallustre | <b>Digital Science and Control Engineering</b><br>Contribution - Conversion of genome sequence to music via coding and assist in Laser Printing   |

## Abstract

**(200 words max)**

Our interdisciplinary group, encompassing digital science, learning science, life science, and Fire PhD, tackled a unique project—creating an art piece from an open prompt. Converging from diverse backgrounds and interests, we focused on a collective vision: an art project combining a collage of magazine images with an original musical composition to accompany its display.

The distinctive aspect was the musical component, birthed through unconventional means. Delving into coding, we translated intricate genetic sequences into an auditory masterpiece—a composition echoing the language of genomes, injecting a unique depth into our artistic endeavor.

For the collage, we sought a more hands-on, traditional art approach. We discussed our passions and decided to shed light on critical issues: global warming, climate change, biodiversity, and antibiotic resistance. The collage aimed to provoke reflection and dialogue, illustrating the interconnectedness of ecological challenges and the necessity for urgent action, weaving together images from magazines, wood cuttings, and acrylic sheets into a compelling mixed-media piece.

This project is meant to embrace the fusion of art and science, emphasizing the strength of creativity in commenting on important scientific narratives.

## B – The project

*(1 page for each + illustrations)*

### **B-1 General Introduction (*contextualize, zoom out, link with Art and other disciplines*)**

Our team was given a project that pushed us to bring artistry and interdisciplinary science together. Our mission? To collaborate on a project that would address some topic we have passion for and a perspective on. Each of us have different backgrounds and interests, so at first it was easy to think we could not find common ground. But once we started to talk we found all of us had an interest in the importance of ecological balance. The shifts and challenges facing our ecological landscape—ranging from the global concerns of climate change to the intricacies of antibiotic resistance in pathogens—have spurred an intricate dialogue that transcends the boundaries of single disciplines. This is the subject that first inspired us, and we are attempting to comment no through this project.

Our project used mixed media: collage and music. We curated imagery from various fields and resources, forming a collage bridging disciplines, showcasing nature's diversity and scientific principles.

Each image is meant to represent a unique perspective on the topic (whether it be biodiversity or the chaos that comes from climate change), inviting contemplation of our symbiotic relationship with nature. The project used data science to translate genetic sequences into a musical composition, revealing the microbial realm's intricacies. The music and the art are meant to work together to strengthen the visceral viewing experience of our project. This approach communicated science through art, deepening the connection between the two.

The project aimed to awaken the audience's awareness of ecological balance by combining visual and auditory elements, highlighting the synergy of art and science.

## B-2 Objectives and aims (*zoom in*)

Climate change is not merely an abstract concept; it is a force that is reshaping our world in profound ways. One of its most alarming repercussions is the rapid loss of biodiversity, which is spreading through ecosystems across the planet. This crisis extends its tentacles into unexpected areas, such as the surge in antibiotic resistance, which poses a threat to human health. Our salvation to this urging matter may lie in nature itself, as it has long been the source of countless natural products that have evolved into novel antimicrobial compounds. However, as climate change progresses, our chances of discovering these life-saving resources diminishes.

Enter "Harmony in Disarray: Nature's Song Interrupted," a visionary project meticulously crafted to unveil the catastrophic consequences of climate change. This project serves as a reminder of the intricate interconnections of our world, offering a captivating showcase of the sheer beauty and diversity of our ecosystems. Through awe-inspiring images capturing the essence of nature and its multiple inhabitants, and music crafted from the genome of microorganisms, we aim to highlight what we stand to lose. Simultaneously, this project reveals the harsh realities of climate change's impact on society. As we confront the alarming issue of antibiotic resistance, we show an interconnected web of challenges. Climate change, through its far-reaching ramifications, not only disrupts ecosystems but also amplifies the threat of antibiotic resistance. The destruction of natural habitats can ruin the delicate balance of microbial communities, leading to the proliferation of antibiotic-resistant bacteria. This sobering reality is underscored by the focal presence of *H. pylori* at the heart of our project—an infamous bacterium known as a global threat due to its formidable resistance to antibiotics. Found onto the bacterium's surface is the structure of clarithromycin, the ultimate recourse in combating *H. pylori* infections. This addition not only pays homage to the complex relationship between antibiotic resistance and the natural world but also serves as a potent reminder of the urgent need to preserve these vital resources.

Our goal is to bring the urgent matter of climate change to the forefront of public awareness. This perilous chain reaction, brought to life in "Harmony in Disarray: Nature's Song Interrupted," underscores the urgency of addressing climate change comprehensively. By connecting the dots between environmental degradation, antibiotic resistance, and societal indifference. We believe that by presenting its multifaceted impacts, from the microcosmic world of antibiotic resistance to the macrocosm of global ecosystems, we can illuminate less apparent aspects of climate change. In doing so, we hope to inspire action and ignite a harmonious response to the discordant forces of climate change, before the song of nature is irrevocably silenced.

### B-3 Planned realization



Creating the collage was a multi-step process. The first thing we did was look at images and catalog ones that we felt inspired by or related to our topics. From here we used an online collage website to create a rough draft for the layout of the collage, mylanding.com. Then came the task of pulling relevant images from magazines. Every person in the group looked through the magazines and cut out images that they felt related to our topic. These images were then organized and placed onto our acrylic polymer canvas. From there we further refined the image's shapes and then stuck them together with glue. One of the most important steps for this process was thinking about what the collage conveyed as a whole, and working with layering as a technique to create depth.

We then made the choice to incorporate a prominent representation of *H. pylori* at the very center of our collage, primarily due to its notoriety for antibiotic resistance. In contemplating the ideal material and crafting technique for this element, we discussed and assessed each component's skill set. Ultimately, we decided to fashion a wooden carving of the bacterium, capturing its characteristic helical shape. We employed a laser cutter found in the maker laboratory to sculpt this wooden piece on a larger scale, ensuring precision and detail. But we didn't stop there; we sought to convey a deeper message through this artwork. We used the laser cutter to etch the chemical structure of clarithromycin onto the surface of the bacterium. Clarithromycin, a semi-natural product, often serves as a last resort antibiotic for fighting *H. pylori* infections.



We selected the biological object, *Helicobacter pylori*, and retrieved its genomic information from the NCBI website. Subsequently, we downloaded the genome and stored it in FASTA format, with its DNA sequence represented by ATCG base pairs. Next, we utilized the BioSeq package in Python to translate the DNA sequence into an amino acid sequence, thereby obtaining information related to gene expression, including gene functions. With the help of the midiutil library from Python, we applied inbuilt music programs of various musical instruments like organ, piano, etc., to annotate various amino acids with musical notes, so that each amino acid corresponded to a specific musical note. Following this, we selected musical instruments, exported the file, and saved it in MIDI format. Through this process, the genetic information of *Helicobacter pylori* was expressed in the form of musical notes.

