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Portfolio 2019–2020

Music and Technology
Hogeschool voor de Kunsten Utrecht

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I AM DANAЕ,

a composer and technical audio designer for games and interactive media. Apart from writing music and developing software, I enjoy storytelling and building often fantastical worlds to accompany these stories. Within the field of music and technology my specialty lies in composing applied music and designing systems and software, in which I combine the things I enjoy doing and try to turn them into my profession. I envision that music can strengthen and add to the immersion in a story and world. This is the main reason why I love to work on music and audio integration for narrative games.

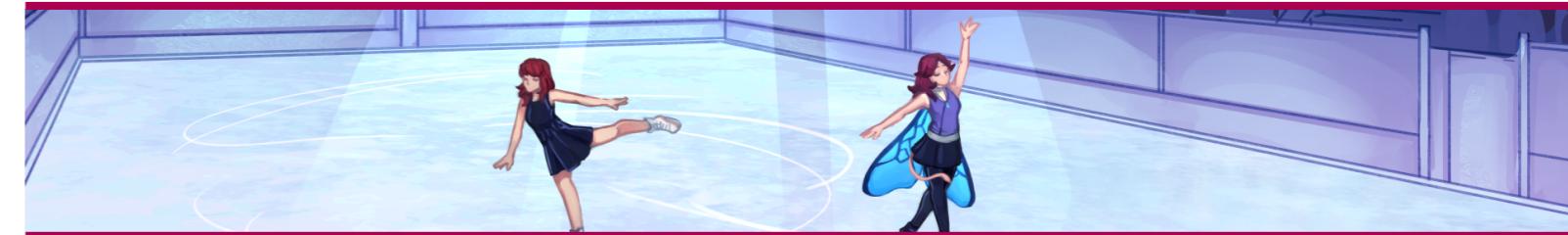
Because gameplay, narrative and audio can be tightly integrated in narrative games, I like to be involved with the conceptualization of such games as well. Understanding the underlying concept of the narrative and how other parts of the game relate to that, enables me to create a fitting music design for the game. In my supportive narrative I have explored different types of music systems in narrative games and how these designs relate to other aspects of the game, including the function of the music itself. This research has given me a lot of insight which I in turn have applied in my own projects.

This document provides an overview of my graduation portfolio, which includes several projects I worked on in the last year. Several of my portfolio projects were done in collaboration with my fellow teammates of Ocarime. This network, consisting of six composers, sound designers and software developers, was formed in September 2019 as a result of collaborations in our third study year.

A red thread through my portfolio items is formed by the three aforementioned pillars that characterize me as music technologist: composition, system design and narrative design. All of my works feature at least one of these pillars, while I try to combine all of them in most of my projects. My ambition for the future is to combine this expertise in my own game studio, where I can bring in my own artistic vision and fascinations as well. I already made a start for this by creating a demo of my visual novel, *Invisible Wings*, which features a story and world conjured up by myself. Apart from this I plan to work as a technical audio designer and/or composer for one or more game studios with a focus on narrative games, as well as continue experimenting with autonomous narrative music.

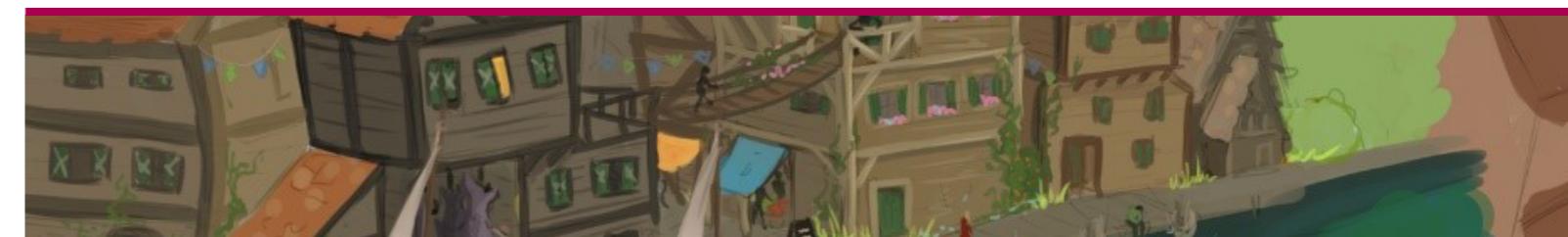
Last but not least, I want to thank everyone who supported me through my journey of becoming a professional music technologist and helped making my ambitions real so far, especially my colleagues and friends from Ocarime, all people who worked with me on *Invisible Wings*, and Ciska Vriezenga and Than van Nispen for their excellent mentoring and much appreciated support during my graduation year.

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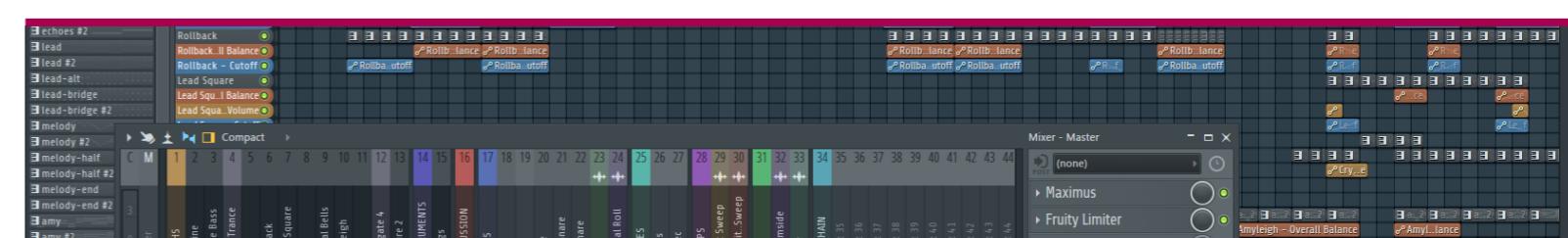
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INVISIBLE WINGS

Invisible Wings is a demo for an interactive visual novel with point-and-click elements. The visual novel is set in a modern fantasy world where humans, faeries, and their hybrid children were supposed to live together. Faeries are believed to be dangerous by humans, because of their touch magic, and so they are prejudiced about hybrids as well.



The story revolves around Dawn, a young hybrid with a great passion for figure skating, as she searches for answers to her own identity, and tries to blend in society as a human by tucking away her tail. After a chain of events at a skating competition, Dawn meets Lilith, a faerie with invisibility magic, much against the urgent advice of her best friend Aranea to avoid faeries. The two eventually become more than friends, but Aranea has different plans with the faerie...

In the beginning of our graduation year, we as game audio designers were given the assignment to put together a "dream portfolio" and successively create an achievable form thereof. This was done in order to become aware of which portfolio items we considered important for our development as a maker. The concept for *Invisible Wings* is the result of this assignment, based on the "dream" of creating a narrative fantasy game based on my own stories, where music takes on a great role to add to the immersion and convey the narrative.

The approach to set up my own project is opposed to working in a team with an often already established concept, which is in my experience more common for game audio designers. However, this way I could shape the project in a way that

Accompanying portfolio items

- 1A-C Demo (Win/Mac builds and video)
- 1D Music system design
- 1E-G Composition sketches
- 1H Target audience research

closely resembles my artistic vision for narrative games and music, and pour in my passion for worldbuilding and storytelling as well. Apart from my work as composer and technical audio designer on this project, I also acted as developer and creative director for the game, which included developing the framework for the game and collaborating with a scriptwriter, illustrator and voice actors.

Because of this broad range of activities, I have split up my work on the project in the following sections, in which I will discuss and reflect on them.

Setting up and leading the project

Recruitment

As soon as I embarked on the journey to give life to the concept of *Invisible Wings*, I was aware that I would not be able to develop this project on my own if I wanted to make a quality game in all fields. I especially have few to none experience with game art and screenwriting, so I needed external people to help me with that. Moreover I wanted to give the characters in the story a voice, by having spoken dialogue by voice actors, because in my opinion this adds to the immersion into the story and brings the characters to life. However, I took matters in my own hands concerning the development of the game, because I wanted to broaden my programming skills in this particular field.

To recruit potentially interested people I used my own network—especially for finding game artists—and placed a call on various websites, in particular forums on Reddit specifically aimed at recruiting a team in the game industry. In my network I found Maricu Mana willing to draw the art for the game. She is an illustrator whom I worked with earlier for personal art commissions, and has a distinctive fantasy art style which I found fitting for the game. Through social media I also came into contact with Eva van der Meer, a first year audiovisual media student at HKU, who was very enthusiastic about the project and the story in particular. She took on the task to write the script and dialogue for the characters, while I could give her constant input and feedback.

Dialogue and voice acting

As mentioned before, I wanted to cast voice actors to give life to the characters in the story. Initially I was planning to use the same platforms I used for recruiting the aforementioned people, until someone hinted me to the site Casting Call Club, a platform specifically made for placing casting calls for voice actors. Out of the 146 auditions that came in on my casting call—where I was only expecting like 10 or so—I selected three voice actors with the help of Eva. In this selection I took a systematic approach by giving all auditions a mark mostly based on aesthetic factors, and selecting those with the highest marks.

In the next stage of the project I plan to delve into cleaning and editing dialogue to bring the performances of the voice actors to a higher level. Sadly, because of circumstances, I didn't have time to edit the lines yet, but they are nevertheless present in the current demo of the game.

Target audience research

I initially didn't define a target audience for *Invisible Wings*, apart from "people who like fantasy stories and/or like to read visual novels", because the game was but a realization of one of my own personal stories. However, because of the underlying themes of being different and self-acceptation throughout the story, I was advised to do a target audience research nevertheless, and so I did.

With the result of this research I could establish a target audience of people between 18–25 years old who are interested in playing narrative and casual games, especially people who can relate to being different and self-acceptation. Based on the results I also decided to develop the game primarily for PC and possibly create ports for handheld or mobile devices in a later stage, if that proves to be viable.

Reflection

At the start of this ambitious project I didn't have any experience with leading a development team, let alone assemble one from nothing or researching a target audience. However, I do view these as essential competences in my ambition to create a game studio, which is the main reason I took the task of doing the aforementioned work myself—which might not be relevant for my work as music technologist at first glance. In the process I effectively led a mini game studio with multiple people working on the project, which is a big step towards the "real" work. Having experience with casting and working with voice actors is useful as well when working as an audio director, something I'm also might be interested in when working on smaller (indie) games.

Game design and development

Process

For the development of the game I decided not to use an already existing visual novel framework, but to write my own framework in Unity. One of the reasons for this choice is that I wanted to incorporate interactive point-and-click elements in the game without much hassle to implement them. Another reason was that I could tightly integrate the music and audio system in my own framework.

The framework I wrote has a modular design. The events that happen in a scene of the narrative are represented by narrative nodes in a (mostly linear) graph, which is traversed upon playing the game. These nodes have a variety of functions, for example basic visual novel functionality such as showing and hiding characters or displaying dialogue. There also exist nodes to initiate point-and-click scenes and choose a next node based on the item that is clicked, or simple user interface nodes that display text or a list of choices. Last but not least, I implemented nodes that interact with FMOD by starting or stopping events or setting parameters.

Apart from this narrative node system, the framework contains a self-written localization system, so that I could easily add translated dialogue lines to the game without much hassle. Initially my plan was to include the dialogue audio files in this system as well, but generalizing the system to support them would take a lot of time. Thus I decided to delegate the handling of dialogue audio to FMOD, which has support for localized audio out of the box.

Reflection

The most useful part of my visual novel framework is its modularity. When I finished the foundation for the framework, it was really easy and quick to add new functionality. On the other hand, setting up this modular foundation was more work than I initially expected. This was mostly due to the fact that I had to become familiar with most of the visual and user interface components that Unity offers. The upside is that I thus became more fluent in developing 2D games in Unity, something I consider important in working with other game developers and in the process of setting up my own game studio.

Another pitfall I encountered during this stage of the project was that I tend to polish code too much right away, instead of finishing basic functionality first. By postponing this finetuning, I could have saved a few days of development time.

Music system design

Process

Based on the critical reviews I did for my supportive narrative, I decided on the music system design for *Invisible Wings*. I especially took a lot of inspiration from the game *Life Is Strange*, because both games depend heavily on dialogue to convey the story. The function of the music in the game is in the first place to convey the mood and setting of the story in the game, but does appear diegetically in the story on a few occasions.

I plan to add segments in the narrative where the music is adaptive to the events. For example, in interactive scenes where the player can interact with the environment, they can unravel information to drive the narrative forward, on which the music will react. Two other examples of this are the skating performances of Lilith and Dawn, where the performance is "interrupted" by Dawn's dialogue and requires interaction from the player.

Because the overall audio system for this project not only includes the aforementioned music system, but also sound effects and dialogue audio, I decided to use FMOD as middleware to implement the audio, to not have to start from zero for every aspect of the audio system. However, I experienced that programming using the FMOD API in Unity has its own quirks, which are mostly due to difference in programming languages. To close this gap, I wrote several extensions that wrap the API code into higher level functions that adhere to the C# standard.

Reflection

Because the decision on the music design was made fairly late in development, I didn't have enough time to implement it in its full form in the project, including the compositions, which I will discuss in the next section. Therefore I can't reflect on the outcomes of the music design implementation yet. However, I gained more experience on designing a music system based on research of existing narrative games, thanks to my supportive narrative.

Composition

Lilith's theme • Process

When I started the project, I had the ambitious idea that the music in *Invisible Wings* should resemble a film score, with themes and leitmotifs for the characters and settings. The first sketch, *Lilith's Theme*, was made with this concept in mind. It acts as a leitmotif for Lilith and would return multiple times to represent her. Although I changed the function of the music to fit the music design, I still plan to use this leitmotif in other cues.

In the composition I tried to reflect Lilith's dreamy, restless and sometimes impulsive personality by using a lydian dominant scale in the main melody, which is played on a bell-like instrument in the high spectrum. The second part of this sketch was meant to play during a sequence where Dawn searches for Lilith in the city and gives a bit of a detective feel.

Dawn's skating performance • Process

The second sketch, *Dawn's skating performance*, will be (obviously) used when Dawn is skating. This cue exists of linear parts and bridge transitions, where the latter are used when Dawn is talking and the player needs to interact with the dialogue. This process is described in detail in the music system design mentioned earlier.

In the linear parts I used phrases from two famous works of Pyotr Ilyich Tchaikovsky—*Dance of the Sugar Plum Fairy* and *Dance of the Little Swans*—to allude to their often clichéd usage in real life skating performances. In the second part I added a layer of percussion to reflect Dawn's desire and determination to win the skating competition. During the bridge transitions Lilith's leitmotif from the previous sketch is heard, because these parts are played during dialogue where Dawn complains about Lilith's flickering wings, which distract her from her performance.

Bedroom • Process

The *Bedroom* sketch was composed after deciding on the music design. This composition will be used in the first scene of the narrative, when Dawn wakes up from a nightmare and tries to calm herself down. The music starts when the player can interact with objects in Dawn's bedroom, in order to trigger dialogue for Dawn where she tells about those things. The composition reflects how Dawn calms down from her nightmare, and builds up some tension using vertical layers when the player gains information about Dawn's backstory.

Reflection

During the research on existing narrative games for my supportive narrative I realized that my initial ideas were not fitting and way too ambitious for this project. Moreover, setting such high standards only worked against my productivity. It wasn't until late April 2020, when I finished aforementioned critical reviews, that I decided on what kind of music design would fit for *Invisible Wings*. Unfortunately, the time that was left for composition was scarce, so I hadn't time to work out the composition sketches and implement them in the music system. This process made me realize it's important to do research and determine a function for the music in time and starting to compose haphazardly doesn't always make sense.

General reflection

At the moment of writing, the development on *Invisible Wings* is still ongoing, but halted for a bit to make time to finish up my graduation. Afterwards I will continue working on the game, especially working out the composition sketches and writing new material, implementing the audio system and polishing the dialogue audio. I plan to release the final demo of *Invisible Wings* in August this year on Steam and Itch.io, two of the leading gaming distribution services. From there, I plan to set up an crowdfunding campaign and look into financial support through subsidies, in order to develop the rest of the story. I envisioned to start this process before my graduation, but time wise that didn't work out as planned.

Nevertheless, I think all the work I did so far on the game and all insights I gained from that—even in disciplines not addressed in the music and technology study at all—form a solid foundation to make my ambition of starting a game studio become real.



PIEN EN DE VISSENSTEEN



Pien en de Vissensteen is a concept for a 3D narrative adventure game in a fantasy setting, created by [Daan Gijzen](#) and [Inge van Riezen](#). The game takes place in a little fishing village where Vera, the antagonist, plans to steal an important artefact. The protagonist Pien must collect information about this plan to prevent Vera from succeeding in her plans.

The work on the music design and implementation in *Pien en de Vissensteen* was a group effort from Ocarime. I myself worked on the design and implementation of the music system for this project. For the music design I collaborated with [Amber Veerman](#) and [Stijn de Koning](#), who composed the music for the game.

Process

We based the music design for the game on the five locations of interest in the fishing village and the major events in the main quest. The overall feel of the soundtrack starts relaxed, but as the player gains more information about the plan of the antagonist, more tension is added in the music. Eventually this tension accumulates in the boss fight.

Amber and Stijn composed different musical cues for every location: a base layer containing percussion, and two or more melodic layers, which are played back based on the progress in the quest. All layers are looped when the player visits a location until they leave. To make the transition between the cues as smooth as possible, we agreed on a few fixed parameters for the soundtrack such as general feel, tempo, time signature and length of the loop. In that way I could implement smooth transitions by synchronizing the beats of the cues.

Because the game is developed in Unity and the music system in itself was simple to implement, I directly coded the system in the game engine. I implemented the audio system in a separate scene based on the concept art of the level map, so that it was modular and could easily be implemented in the eventual level by Daan. Unfortunately the game hasn't been finished into a playable demo, so the music system is still an isolated artifact for now, albeit coupled to the narrative.

Reflection

From this project I gained more experience in the design of music systems, which contributed to my research in my supportive narrative. I also became more fluent in (audio) programming in Unity and C#, which I consider valuable in the process of selecting the best development approach on a per project basis.

Working on *Pien en de Vissensteen* also gave me more insight in collaborating with other people, both composers in my own discipline and game designers. I especially put effort in making the audio system easy to implement in the game, because Daan and Inge were not that experienced in coding.

As mentioned, the game will not be finished anytime soon, which is due to a shift of focus by the game designers, and so the music system can't be evaluated in its full form. The communication on development on and changes of the concept were not always that clear between the game designers and the audio team, which sometimes lead to difficulties on the audio side. Nevertheless it was a valuable experience to work on this project.



OCARIME: THE GAME

Ocarime: The Game is an interactive portfolio website for the members of Ocarime. The game is modeled after a top down role playing game, such as the older *Final Fantasy* series. In the game the player meets the team members of Ocarime as non-playable characters. The player can listen to their music and view their portfolio by interacting with the environment and objects. The game itself acts as a portfolio item for the team as well, and shows what its members are capable of creating.



System design · Process

We came up with the idea of creating this interactive portfolio site as a result of an assignment about defining and establishing our project group, i.e. the sonic interaction design network. As far as game design goes, our idea was to give each team member their own room in the game map, where their portfolio is showcased in the form of interactable paintings and a compositions or soundscape that is played through a speaker. These six compositions together form a nonlinear composition which is based on the position of the player. To create this "umbrella" composition, we decided on some fixed parameters for the musical cues that each of us would use in our composition, such as tempo, length, and key signature.

After we worked out the concept for the site and the music design, I took the lead in developing the game engine and the audio system, with the help of Stijn de Koning. All team members would deliver the content for their own portfolio and give feedback on the development process.

Accompanying portfolio items

- 3A-B Demo (browser build and video)
- 3C Music system design
- 3D Composition

Because we wanted to incorporate the game as an interactive part of our portfolio site, I decided to use HTML5 and JavaScript to write the game engine, using the [Canvas API](#) for visuals and the [Web Audio API](#) for the audio system. I could have used one of the handful existing frameworks for HTML5 games instead of writing the game engine from scratch. By doing the latter, I practically had to reinvent the wheel for most components in the engine, but on the other hand it gave me more insight into the inner workings of game engines—the engine I coded from scratch is oddly similar to some aspects of the Godot game engine.

Composition · Process

As for the composition that is heard in my own room, I took an autonomous composition sketch I was working on at the time and adapted that to fit the discussed parameters. I found this composition to be more characteristic in my own portfolio than when I had to compose a new applied piece—on which I elaborate in the last chapter of this document.

Reflection

Ocarime: The Game is a great example of my work as both a composer and technical audio designer. It showcases many of my qualities, such as designing and developing systems and composing and implementing (nonlinear) music. Therefore I'm very content with the outcome of this project so far. As a team we still have plans to further polish the game in the near future, in order to showcase our abilities as a team.

I used this project to further refine my knowledge of HTML5 and JavaScript and working with new audio integration tools, such as the Web Audio API. Because of the modular approach I used in developing the engine, I was able to tightly integrate the audio system in the game engine, probably more integrated than when using a predefined framework.



Composition

EXODUS BURNED: CINEMATIC



Exodus Burned is a multiplayer VR experience created by [Pillows Willow VR Studios](#), where players use their whole body as a controller in an e-sports match by means of a harness equipped with motion capture sensors. Two teams of two players compete against each other to reach the only way to get away from the burned spaceship you're stuck on: the only undamaged escape pod, hanging high up above the arena.

In 2018–2019 I worked as a technical audio design intern on this game, especially on the audio system that manages the audio playback on all devices, including big screens that feature an auto-generated livestream of the match that is played. In late 2019 I was approached by Peter Kortenhoeven, the creative director of Pillows Willow, to create music for a cinematic that will be played at the beginning of the livestream, when players are preparing for the match by putting on their harnesses. I mainly took the opportunity of writing music for this cinematic to develop my skills in writing music for linear media.

Process

During my internship the game designers and I already experimented with playing back music during the preparation of the players. We noticed that a bombastic and epic opening worked great to stimulate the players and build up tension, as opposed to the more electronic music during the match. I thus based the composition for the cinematic on "epic" orchestral music, taking inspiration and reference from the music from *Two Steps From Hell*.

In the process of composing the music, I re-used melodic themes and motifs from the musical cues that are played during a match, in order to create a coherent flow in the music during the entire game. Apart from that I also adapted the composition to

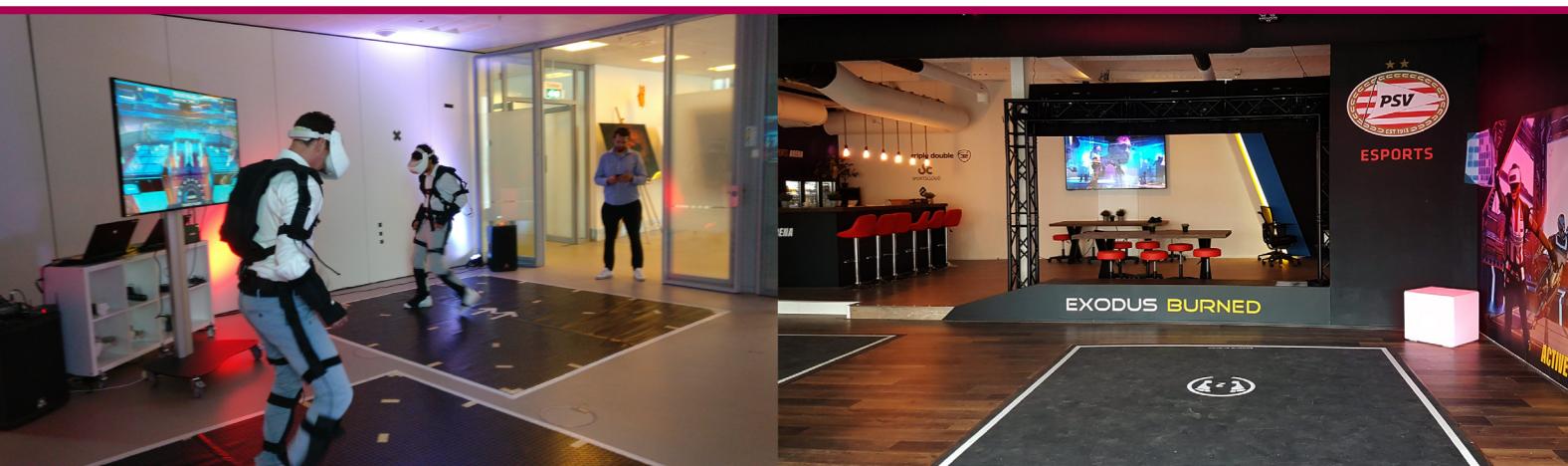
the visual cues in the cinematic. For example, the main cue of the composition starts at the exact moment the spaceship is hit by a meteorite.

The composition was passed back and forth a few times between me and Peter and his team. The first feedback round already made clear that the composition worked great in its context and everyone in the development team was very enthusiastic about the music. That left me with doing a few iterations of adding layers and polishing. Eventually the cinematic with my music was used as the grand opening of the [Active Esports Arena](#) in Eindhoven, where the first installment of the game is presented.

Reflection

This commission gave me more experience with writing applied compositions for linear media. It also helped me to gain insight in borrowing elements from already existing music to create a coherent musical context for the experience. Moreover, working with a professional client and applying their feedback iteratively was a valuable experience.

I think a point of improvement in my composition techniques would be to have researched more about cinematic orchestral percussion, in order to emphasize the tension building in the composition. Also, I originally planned to add sound design to the composition, for example to highlight the collision of the meteorite and the machinery inside the spaceship. However, due to circumstances, including a lack of time, I haven't gotten around to experiment with fitting sounds, which isn't my primary field of expertise and requires some time to dive into.



AUTONOMOUS COMPOSITIONS

As mentioned, apart from applied work for games and interactive media, I also enjoy telling my own stories and conveying them through music. In the last year I made plenty of musical sketches, mainly to gain inspiration for applied compositions, but also to experiment with new sounds and composition techniques. I want to elaborate on two of those compositions, which I plan to release as an EP later this year, along with other worked out sketches.



We In Heaven · Process

We In Heaven depicts the lofty an exalted state of being in love with someone, which is reflected in the euphoric melody and chord progressions. This composition is a remixed and remastered version of the original track with the same name, composed in 2012. I composed this "reincarnation" because I wanted to re-create one of the tracks that, in my opinion, influenced my musical style the most in those days. Yet now I used the tools and techniques I learned during my study at HKU, as well as my knowledge of what makes my music distinctive to let that stand out in the composition.

As *We In Heaven* is a trance track, a genre characterized by its musical form with buildups and climaxes to simulate being in trance, it makes heavily use of repeating material and vertical layers. I started using this cell-based composition technique at the same time I was experimenting with trance music around 2013, albeit unconsciously. Over time, using this technique became very characteristic—I would even say the most characteristic—in my own work, including the trance-like tracks I produced in 2013–2015 and my more recent applied compositions during my time at HKU. Using this technique also proved to be useful in composing nonlinear music, as a cell-based approach is often the base of adaptive music techniques like vertical layering and horizontal resequencing.

- 5A Composition · We In Heaven
- 5B Composition · Entanglement

Entanglement · Process

Entanglement tells the story about a little fairy in an enchanted world, whose reckless demeanor causes her to fly into a spider web. Still half fainted by her crash, she quickly becomes aware of her situation as a spider approaches, who plans to have the fairy for dinner. She manages to escape barely in time, flying onward afterwards, as if nothing happened.

I composed this track only last month, in May 2020, in an effort to gain new inspiration and motivation for my compositional work on *Invisible Wings*. My goal was to create a composition based on a narrative concept, which turned out way better than expected. This narrative is portrayed in a linear way throughout the track by different melodies and harmonies, while the instrumentation reflects the nature-like and ethereal world of the fairies.

I'm very content with the outcome of this composition, because it characterizes me as a creator in various ways—which is also the reason I put this particular work on my portfolio. Firstly, it is very characteristic for my workflow of creating compositions (and music designs in extent) based on a narrative or setting. Second, the composition is a great example of using my distinctive musical style, like often using instruments in the high spectrum for the main melody. Lastly, I experimented with new composition techniques in this work, such as writing variations on the different main melodies within my characteristic cell-based method.

Reflection

Creating autonomous works gives me the opportunity to fully utilize components of my musical style, discover new and interesting sounds and experiment new composition techniques. This way these compositions act as a source of inspiration and learning experience at the same time. More often than not these compositions feature an underlying narrative or "mood" as well. Reflecting on *We In Heaven* and *Entanglement* specifically, these works are indeed very characteristic for my workflow and musical style respectively. Both works feature novelties though: newly discovered sounds in the former and new composition techniques in the latter.