

A MUSICAL PORTRAIT OF TRITON, THE ROGUE MOON OF NEPTUNE

Austin Ali

TC660H
Plan II Honors Program
The University of Texas at Austin

December 3, 2019

Dr. Yevgeniy Sharlat, D.M.A.
Butler School of Music
Supervising Professor

Dean Andrew Dell'Antonio, Ph.D.
College of Fine Arts/Butler School of Music
Second Reader

ABSTRACT

Author: Austin Ali

Title: A Musical Portrait of Triton, the Rogue Moon of Neptune

Supervising Professor: Dr. Yevgeniy Sharlat, D.M.A.

This thesis explores the worlds of astronomy and music telling the tale of Triton, the once dwarf-planet-turned-moon. The central creative work, *Triton, the Rogue*, a seven-minute musical composition for wind ensemble, follows Triton's journey translating scientific facts into a musical narrative. The accompanying thesis treatise details the science behind Triton's story and explains the musical decisions made to faithfully portray Triton in a piece of instrumental music.

ACKNOWLEDGEMENTS

Thank-you to **Yevgeniy Sharlat** for being the best composition mentor for me and for accepting the role of thesis supervisor despite your increasingly crazy schedule these days. Thank you for guiding me through the challenges of the creative process and helping me produce an academic and musical work of which I am extremely proud. You have been my go-to advisor from day one at UT, and I am honored and privileged to have had the opportunity to learn from your example these past four years.

Thank-you to **Andrew Dell'Antonio** for jumping onto this thesis project on short notice and excelling in the role as second reader. I cannot thank you enough for your insightful comments, enlightening discussions, and brilliant ideas to improve my work. Thank you for making my experience studying music history a meaningful one and for all of your support in my academic and creative endeavors.

A very special thank-you to **Shiree Williams** and all the musicians of the **University of Texas Wind Symphony** for all your hard work bringing the music of *Triton, the Rogue* to life. Thank you Shiree for your intense study of *Triton* and your passion and enthusiasm brought to your craft of conducting. And thank-you to musical director **Scott Hanna** for devoting the Wind Symphony's valuable rehearsal time for the recording of the *Triton*.

Thank-you to **Nina Cline** and **Katherine O'Donnell** for making the Plan II Senior Thesis experience as smooth as possible. Thank-you to Nina for your memorable lectures on writing tips—I am proud to say I have improved as a writer thanks to your advice. Thank you Katie for guiding me and all my Plan II peers to the finish line and advising us since the beginning of our time at UT.

Thank-you to **Donald Grantham, Russell Podgorsek, and John Mills** for mentoring me as a composer these past four years at UT. This work would not be possible without the lessons I learned from your experience. A special thank-you to Dr. Grantham for nurturing my first ideas to compose a suite called *The Moons*, starting me on the path leading to *Triton, the Rogue*.

Thank-you to **Richard Reddick** for meeting with me in the very beginning stages of the thesis project and sparking a wonderful conversation about merging astronomy and music into one thesis.

Thank-you to **Brian Doherty, Allen MacDuffie, and Michael Harney** for teaching me valuable lessons about literature, literary analysis, and writing, giving me the tools to successfully complete this thesis. Thank you for challenging me in your classes and pushing me to become an effective communicator and writer.

Thank-you to **Anthony Corroa** for your mentorship these past four years and helping the next generation of young composers find success.

Thank-you to all my friends, mentors, teachers, and family for giving me advice, proofreading my writing, attending my performances, listening to recordings of my work, and encouraging me in my musical endeavors. You all make my dream to become a professional composer possible.

And finally, a huge thank-you to my parents and my brother for being my biggest supporters in my entire life. I could not have made it to this point without you.

TABLE OF CONTENTS

CHAPTER I: INTRODUCTION

CHAPTER II: THE STORY OF TRITON

CHAPTER III: COMPOSING *TRITON, THE ROGUE*

Instrumentation and Overview

“Introduction”

“The Kuiper Belt”

“The Clash”

“The Ring”

CHAPTER IV: *TRITON, THE ROGUE* FOR WIND ENSEMBLE

CHAPTER V: CONCLUSION AND FUTURE PLANS

WORKS CITED

BIOGRAPHY

CHAPTER I: INTRODUCTION

Triton, the Rogue derives its inspiration from *The Planets* (1914-16), a wildly popular and influential suite for orchestra composed by Gustav Holst. *The Planets*' influence reaches into popular culture as far as John Williams's score to the iconic film *Star Wars* (1977). Notably, Williams quotes the bombastic ending of *Mars, the Bringer of War*, the first piece from *The Planets* suite, in the first three minutes of *Star Wars*. Continuing in the tradition of borrowing from and expanding upon composers before me, I aim to respond to *The Planets* through my own suite of pieces entitled *The Moons*. As John Williams brought Holst's influence from the concert stage to the cinema, I wish to channel Holst's influence from the orchestra to the wind ensemble.

In its current state as of November 2019, *The Moons* for wind ensemble consists of two completed pieces, *Titan, the Bold* and *Triton, the Rogue*, lasting four and seven minutes in duration, respectively. Like *The Planets*, *The Moons* will focus on a subset of the moons in the solar system. Holst did not write a piece for every planet orbiting the sun; in fact, Holst omitted Earth (and later Pluto after its discovery in 1930). Likewise, I do not plan on writing a composition for all of the known moons in the solar system—that would be over two hundred pieces of music. Instead, I intend to compose a few pieces about my favorite moons, compiling them in a collection of vignettes. Within the bounds of the Plan II thesis, I will focus on the composition process and underlying narrative of *Triton, the Rogue* based on Triton, the moon of Neptune.

Holst left out the Earth from *The Planets* because he rooted his composition in astrology, or the subjective associations of planets and human behaviors, not astronomy, the scientific details behind the planets. As Raymond Head illustrates in "Holst - Astrology and Modernism in 'The Planets,'" astrology played a major role in *The Planets*. Head writes, "[here] I want to investigate the particular interest Holst had in astrology and how it resulted in the striking modernism of *The Planets*. Central to this work lies Holst's own understanding of astrology..." (Head 16). Accordingly, in *The*

Planets, each movement takes on the identity of a character with a personality, such as *Mars, the Bringer of War* or *Uranus, the Magician*. On the other hand, in my composition, *The Moons*, I emphasize the scientific aspects of each moon to create a compelling story. For example, *Triton, the Rogue* follows the journey of Triton transforming from a dwarf planet to a captured satellite of Neptune, eventually crumbling down to a debris ring. Only after composing each moon do I attribute a character aspect when naming the piece. “The Rogue” epithet stems from Triton’s origins beyond its current host planet of Neptune in the outer reaches of the solar system and the chaos of the collision between Triton and Neptune’s ancient moons.

This thesis consists of a chapter describing the scientific origins of Triton and how those facts translate to a narrative structure capable of musical adaptation. The following chapter explains how I adapt the story of Triton to music written for the wind ensemble. Additionally, the second chapter explains how *Triton, the Rogue* responds to Gustav Holst’s *The Planets* by connecting to the final piece of the suite, *Neptune, the Mystic*. Finally, the creative portion of the thesis includes the musical score of each instrument’s part to the composition and a recording of *Triton, the Rogue* performed by the University of Texas Wind Symphony conducted by Shiree Williams.

CHAPTER II: THE STORY OF TRITON

Triton's story begins in the cold outer reaches of the Solar System known as the Kuiper Belt. In this distant region three billion miles away from Earth lie thousands of asteroids and several icy dwarf planets including, most famously, Pluto. Billions of years ago, Triton enjoyed the status of dwarf planet, orbiting around the Sun like any other planet, and the luxury of its own moon akin to Pluto's Charon (Nogueira et al.). Over eons, however, Triton's orbit around the Sun aligned with its neighbor, gas giant Neptune—making the two destined for a catastrophic collision. When Triton finally arrived at Neptune, the two planets did not collide, although Triton's massive gravity sent Neptune's moons (and likely Triton's own moon) flying in all directions. The ancient moons shot off into space, smashed into each other, and crashed into both Neptune and Triton in a violent event. The scattered debris eventually reconstituted itself into a new generation of moons around Neptune—only comprising 0.5% of Neptune's satellite mass. The other 99.5% was dominated by Triton, Neptune's new moon caught by Neptune's gravity (Masters et al.)

As a moon, Triton stuck out in more ways than its relative size. Triton travelled around Neptune in the opposite direction than Neptune's own rotation in a retrograde, backwards orbit. In fact, Triton is the only large moon (a moon massive enough to be round due to its own gravity) in the entire solar system to revolve around its host planet in retrograde. Triton's orbit also wrapped around Neptune at an awkward inclination angle of 157° from Neptune's own equator. So, Triton stuck out like a sore thumb: Triton travelled around in the opposite direction from all of Neptune's other moons and orbited at a lopsided angle to Neptune's own rotation. Observations of details like these led scientists to suspect Triton originated not from Neptune but from the outer solar system (Nogueira et al.). Furthermore, Triton's origins from beyond Neptune meant Triton was comprised of heliocentric matter, or matter from the sun in the solar system's early formation. Neptune's other moons consisted of planetocentric matter, or matter derived from Neptune in our solar system's

early history. Over time, remnants of past destroyed Neptunian moons would fuse with Triton, eventually making up approximately 20% of Triton's own mass, becoming a hybrid of foreign heliocentric matter and Neptune's planetocentric matter. Triton, the rogue moon from far away, became part-Neptune. Scientists further deduced that a destructive encounter between Triton and the Neptunian system leading to Triton's capture would have astronomical consequences. First, due to the impacts of Neptune's moons into Triton and tidal forces from Neptune, Triton would undergo global warming, and icy components below the Triton's surface would begin to melt. This melting would, in turn, lead to a subsurface liquid ocean of chemicals—a potential place for life (McKinnon et al.). However, due to Triton's accretion of material, Triton's orbit is degrading. In other words, Triton is gradually approaching Neptune, sinking further and further into Neptune's gravity well, destined again to clash with Neptune (Masters et al.).

This time, though, Triton's fate will be sealed not by a violent crash but by a gradual decline. As Triton creeps toward Neptune in its dying orbit, Neptune's gravity will slowly tear apart Triton, ripping it into dust. This dust will eventually form around Neptune into a beautiful ring like the ring of Saturn, thus bringing an end to Triton's journey.

In many ways, the tale of Triton reads like a fall from grace story: a narrative through which a character loses status or reputation. For example, in the Christian Bible, the once beautiful angel Lucifer defies God, falls from heaven, and becomes the Devil. Likewise, Triton begins its history at its highest point: a dwarf planet boasting its own moon and place in the solar system. In essence, Triton is living in planetary heaven. However, as the gap between Neptune and Triton's paths contracts, the peace shatters. In one fell swoop, Triton massacres Neptune's moons and its own moon while invading the Neptunian system. As *punishment* for Triton's crime, Neptune captures Triton, demoting it from the status of dwarf planet to moon. Triton has fallen from grace. Imprisoned for life, Triton again faces the looming danger of crashing into Neptune. But this time,

instead of destroying other moons, Triton gradually becomes a beautiful ring around Neptune, finding some kind of redemption for its evil deeds. Analyzing the narrative as a fall from grace story allows Triton's history to become more than a collection of scientific facts; it becomes part of a larger, more familiar genre to the audience.

The tale of Triton also invites a compelling narrative arc suitable for adaptation in a musical composition. In the exposition, I introduce the main character, Triton, in the setting of the distant Kuiper Belt. In the rising action, Triton approaches Neptune, spelling doom. The climax of the story occurs when the two worlds collide, destroying countless smaller moons. In the falling action, Triton serves its time as a moon of Neptune, destined to once again return to peace as a beautiful ring.

In a musical composition, all of the narrative terms discussed above form the elements of program music, a piece based on a story. A famous example of a programmatic composition includes 19th century French composer Hector Berlioz's *Symphonie fantastique*, a five-movement composition telling the tale of the imagination of a dying artist. Berlioz's symphony set a precedent in Western music because the piece recounted its plot not through words but purely through Berlioz's orchestration and composition. Program music contrasts with absolute music, which contains no extramusical narrative—music for music's sake—a good example of which is Ludwig van Beethoven's Symphony No. 5. While both absolute music and program music can convey the sense of narrative drama through musical gestures and devices, only program music exists as the companion to a specific accompanying plot. In this way, the elements of exposition, rising action, climax, falling action, and resolution map on to program music through musical form. Musical form refers to the structure of a composition over time, accounting for repetitions and developments of musical material. Often, musicologists and music theorists represent form through capital letters, where each letter represents a distinct section of music. For example, in Western music, compositions in rondo form feature a recurring section of music interspaced with contrasting

sections of music. An instance of rondo form could be represented as ABACA, where A corresponds to the recurring refrain of music and B and C indicate contrasting musical passages. Analogously, a musical exposition and resolution could be represented in musical form as A...A', where A denotes original material and A' represents a return to the original material but with some kind of noticeable change.

In *Triton, the Rogue*, I have chosen elements of formal organization specifically to suggest the narrative of fall and redemption outlined above. For example, the overall form of *Triton* is through-composed, meaning no major section of the piece repeats. The choice to avoid large formal repetition mirrors Triton's striking transformation through the story, where each phase of Triton's cosmic life differs significantly from each other. However, on a more subtle level, musical aspects of *Triton, the Rogue* do recur, hinting at a narrative arc. For example, *Triton* begins at the calm tempo of 90 beats per minute (bpm) then notches up to an agitated 112 bpm for the majority of the composition. After the climax of the piece, the tempo steadies back at 90 beats per minute. So, *Triton's* musical form in tempo suggests an ABA structure, starting at one place, making a departure, then returning to that starting point. Like Triton, the composition experiences dramatic changes in its lifespan, ramping up in intensity over time then eventually settling back down, reflecting an overarching story.

CHAPTER III: COMPOSING *TRITON, THE ROGUE*

Instrumentation and Overview

I composed *Triton, the Rogue* as part of a larger suite entitled *The Moons*, scored for wind ensemble. The wind ensemble instrumentation includes woodwinds, brass, and percussion and resembles a symphony orchestra minus the string section. However, the wind ensemble often includes more wind instruments than a symphony orchestra, notably adding the saxophone and euphonium sections. I chose the wind ensemble over the orchestra because the canon of wind ensemble literature is still developing. In other words, in Western music history, the symphony orchestra originated far further back in time, with dozens of composers contributing to orchestral music over generations. Eventually, American orchestras, for example, settled on performing a standard repertoire, or as Dowd et al. put it, “U.S. symphony orchestras tend to emphasize the familiar works of a few composers—the ‘classics.’” In this way, American orchestras impose high barriers to entry by a young or new composer like me.

On the other hand, the modern wind ensemble came about later in history. While many wind ensembles in Western culture existed since the 18th century, these bands served primarily the function of a ceremonial or outdoor performance. However, from my perspective, in the twentieth century, the wind ensemble shifted from a primarily outdoor ensemble to one suited for the concert hall. In an essay entitled “A Brief Historical Perspective of the Wind Band,” Jeffery Renshaw points out “[the] first significant work for the windband in the twentieth century was by Gustav Holst (1874-1934).” Renshaw’s quote, referring to Holst’s *First Suite in E-flat for Military Band* composed in 1909, contextualizes the wind band timeline as a recent development of the past 100 years. I interpret Holst’s *First Suite in E-flat* as a transition piece from composers treating the wind band as a ceremonial band to an ensemble on the same level of sophistication as the orchestra. Additionally, from my own experience, I learned American bands actively support the creation of new music for

winds because their audience is primarily young people and less susceptible to the existing biases in Western music toward “the classics.” Wind band composers in the United States often write for student ensembles in universities, high schools, and middle schools, explaining the abundance of young people exposed to band music. In summary, the wind ensemble repertoire has room to expand and an appetite for new music, attenuating the barriers for the young or new composer to add to that canon. Continuing in the tradition of Gustav Holst in his orchestral and wind writing, I plan on contributing my own work to the wind canon.

Triton, the Rogue follows the story of Triton, the dwarf planet and later Triton, the moon. The piece, roughly seven minutes in duration, consists of four sections entitled “Introduction,” “The Kuiper Belt,” “The Clash,” and “The Ring.” The four parts vary in musical texture, harmony, and orchestration but maintain a cohesive whole through recycling of seed melodic, harmonic, and spatial material. In other words, a constant thread of musical material established in the introduction persists in some form throughout the duration of *Triton* to give the composition unity.

“Introduction”

In the “Introduction,” I focus on creating a feeling of mystery and space through tension-filled harmony, emulation of audio techniques, and positioning of the instruments on stage. An audience member should listen for the emergence of the piece from silence as background noise becomes a piece of music. One should also listen for the trumpets placed off stage, slowly emerging like the image of a planet coming into focus in the distance.

Immediately, the first sounds of *Triton* invoke Gustav Holst through quoting *Neptune, the Mystic*, the final movement of *The Planets*. The quote stems from the ending of *Neptune* where Holst concludes the piece by introducing an entirely new set of musicians: a women’s choir. For the vast majority of the forty-five-minute-long composition, Holst utilized only the symphony orchestra

instrumentation. However, perhaps in order to end the piece with a sense of mystery, Holst placed a women's choir backstage, out of sight of the audience. In the final few minutes of *Neptune* (and, by extension, *The Planets*), the orchestra evaporates away into the offstage choir accompanied only by harp. As the harp disappears as well, the choir ends the composition fading into silence. The ending to *The Planets* represents a striking non-recorded example of the now common fade-out audio production technique: a device through which music producers gradually decrease the volume of a track of music into silence. Holst achieved this effect not through speakers but with live musicians in the women's choir, staged farther back from the audience than the orchestra on stage. In *Triton, the Rogue*, I use the same technique of offstage musicians to begin the piece, fading in from silence.

Triton begins mysteriously as flickers of sound emerge from nothing, creating the opposite sound effect as *Neptune's* fade-out. The first notes in *Triton, the Rogue* directly stem from the ending of Holst's *Neptune*: a repeating chord progression from C-sharp minor to A half-diminished seventh. Holst's harmonies, functioning as a tension chord (A half-diminished) and resolution chord (C-sharp minor), produce what I perceive as a sense of mystery through constantly oscillating between stress and release. In music theory, tension chords often contain a note called the *leading tone*, a prominent note in the harmony close in pitch to a note in the resolution chord. The concept of a leading tone pulling toward its resolution conveys to me a sense of musical gravity—the proximity of the harmony, like that between two objects with mass, creates a mutual attraction. In the case of Holst's harmonies in *Neptune*, the A half-diminished chord contains two leading tones to C-sharp minor, illustrating what I interpret as a considerably powerful force of gravity at the heart of the mysterious chord progression.

Instead of orchestrating these mysterious, gravitationally charged harmonies with a women's choir, I chose to use four muted trumpets, a grouping of instruments native to the wind ensemble. The combination of trumpets playing offstage with mutes diminishes the sound of the trumpets,

creating the effect of distance from the audience. I do not necessarily intend for the audience to pick up quote of Holst's chords; however, I do wish to convey a sense of mystery and distance through my reinterpretation of Holst's chilling ending to *The Planets*.

The opening to *Triton, the Rogue* also includes a crucial musical detail: the music plays in reverse with respect to Holst's *Neptune*. In music theory, the technique of reversing the order of notes is called *retrograde* (where ABCD, for example, becomes DCBA). One of the most important scientific facts I learned about Triton, the moon, is that Triton orbits Neptune in *retrograde*. So, using this musical pun, I re-orchestrated *Neptune's* ending as *Triton's* beginning, completely in retrograde. In the process of reversing Holst's music, I added a compositional layer to the mix. In addition to rewinding the notes in Holst's score, I reversed the sounds from an audio recording of *Neptune*. I obtained a public domain copy of *The Planets* recorded by the National Youth Orchestra of Canada and utilized computer software to generate a reversed *Neptune*. To my ears, the sounds in that backwards *Neptune* recording struck me as even more mysterious than the original piece. Before I could hear the women's choir, I heard the wisps of reversed ambient sounds in the concert hall. Reversed sounds sound eerie because they can appear in a rush and disappear without warning into complete silence. So, in the spirit of the mystical *Neptune* and creating a mystifying atmosphere, I embraced the rustles and rushes of ambient noise and incorporated them into *Triton*. To execute these sounds, I orchestrated the reverse effects in flutes, alto saxophone, guiro, and sandpaper blocks. The percussion instruments (guiro and sandpaper blocks) achieve the rushing effect by both incorporating a brisk sliding motion in their playing technique. The wind instruments (flute and saxophone) complement the percussion volume in a "whoosh" sound through blowing air, then stopping abruptly by closing the air pathway with the tongue.

The entire introduction section of *Triton* continues as a re-orchestration of *Neptune* in retrograde. The composition utilizes different instruments to play the same notes Holst wrote, and

through my reimagining of the piece, those notes and sounds themselves play backward. To use a visual analogy, using different instrumentation is like using a new color palette. If the introduction to *Triton* were a painting, it would look like a mirror image of *Neptune* with a contrasting color scheme.

Triton's mysterious, reversed introduction fits into the narrative of the moon's origin by providing exposition: as the music slowly fades in, a blurry reflection of Neptune comes into focus. The trumpets, playing the same notes from Holst's *Neptune*, represent the planet Neptune. The audience, placed into the point of view of Triton, hear Neptune in the distance spinning backwards because from Triton's perspective, Neptune is the rogue rotating in retrograde.

“The Kuiper Belt”

“The Kuiper Belt” section of *Triton* again invokes the compositional device of offstage muted trumpets to create a distant sound from the audience. In this instance, I use the concept of distance to illustrate the fact that Triton comes from the farthest known part of the solar system: The Kuiper Belt. However, the character of the piece dramatically shifts from mystery to chaos. To depict this change in character, I arrange the trumpets in harsh, dissonant harmony. The chords the trumpets play derive their pitches from the *tritone* interval, considered in Western music to be one of the most discordant relationships between two notes, historically referred to as the *diabolus in musica* or “the Devil in music.” Because both the Devil and Triton represent characters fallen from grace, the concept of the Devil, and therefore its associated harmonic interval the tritone, connect back to Triton. In addition to the tritone's history, I also used it because of the (irresistible) musical pun: Triton is represented by a tritone. Furthermore, in “The Kuiper Belt,” I lace two tritones together to create an even darker and more horrific sound than a single tritone.

In response to the discordant fanfare in the trumpets, the timpani, bass drum, and brake drum answer at their highest volume, beating ferociously. These three drums act as a warning signal:

Triton has begun its approach. The vibraphone, on the other hand, responds to the trumpets in a different manner. As the trumpets release their tritone chord into silence, the sustained sound of the vibraphone continues the harmony of the trumpets as they rest. However, since the vibraphone enters softly while the trumpets are playing loudly, the sound gives the impression of a distant echo. The spatialization of the percussion in the back row of the wind ensemble and the trumpets off stage continue to reinforce the metaphor that Triton is far away in the distance. Additionally, for practicality's sake, allowing the trumpets time to rest provides them the opportunity to remove their mutes before their next entrance. Accordingly, when the trumpets enter the second time, they have removed their mutes, slightly augmenting their sound and creating the perception of the sounds of Triton moving closer. This time, the echo following the unmuted trumpet episode sounds through the clarinets and saxophones. Because the clarinets and saxophones sit closer to the audience than the percussion, the sound once again takes another step towards the audience. Furthermore, to paint a vivid picture of Triton's features, I direct the saxophone and clarinet parts to play "dry sound, no vibrato." Without the expressiveness of the musicians' vibrato, the sound takes on a cold, inhuman quality, representing the icy, untouched surface of distant Triton.

Following the chilling saxophone-clarinet echo, the flutes, bassoons, and 1st clarinet continue the dissonant tritone harmony at a quicker pace. The alteration in harmonic rhythm illustrates Triton's increasing speed toward Neptune leading to "The Clash." Additionally, the division of the 5/4 time signature changes from 2+3 to 3+2. In other words, the rhythmic emphasis shifts from a grouping of two beats followed by three beats to its inverse, three followed by two. This reversal in metric pattern helps to further create an air of unrest in the music. As a steady pulse emerges out of the metric shift, several elements of the music fight against the newfound stability, portraying Triton's imperfect, faltering solar orbit. For example, as instruments like English horn and French horns carry the melody, other instruments such as the trombone interrupt them,

interjecting before the tune finishes. By introducing such unpredictability, *Triton, the Rogue* slowly descends into instability and chaos.

At this point, *Triton, the Rogue* begins to make heavy use of material established in the “Introduction” section to retain some sense of overall cohesion for the work. As a consequence, bits of Holst’s *Neptune in retrograde*, the basis for the “Introduction,” find their way into *Triton, the Rogue*. For example, the piccolo, piano, and glockenspiel recall a lyrical, sustained melody from the “Introduction,” this time harmonized in dissonant tritones between the glockenspiel and piano. Invoking the original lyrical melody through a warped lens of discordant harmony creates an unsettling feeling: the once pristine memory of Neptune in the exposition becomes distorted. Neptune, previously safe and untouched, now faces the impending threat of an approaching rogue dwarf planet, represented by the image of Neptune breaking down through reharmonization. As another interruption to the distorted Neptune melody, the tuba and euphonium repurpose the French horn solo from the “Introduction,” changing the solo into a repeating bass line. While the repetition of the bass line helps establish a consistent element in *Triton*, the melodies and countermelodies constantly clash with the bass line in dissonant harmonic intervals. I further emphasize the dissonances by placing them at the beginning of musical phrases or on strong musical beats. In this way, compositional framework of *Triton* works against itself: by design, *Triton*’s melodies, harmonies, countermelodies, and bass line counteract each other. The self-contradiction of the fundamental musical elements of *Triton* serve as a metaphor for Triton’s own story: Triton’s orbit was predestined to clash with Neptune’s orbit.

Triton, the Rogue continues to develop towards “The Clash” by introducing a looping figure in the saxophones. The pitches the saxophones play in the repeating ascending line directly stem from the trumpet harmony established in the beginning of “The Kuiper Belt.” The saxophones are outlining dissonant tritone harmony. The repeating figure motive moves at the pace of the eighth-

note, faster than the dominating quarter note pulse. In effect, the motive propels the piece forward, adding motion while continuing in the same harmonic vein. The clarinets join in the looping figure an octave above, further contributing to the increasing intensity of the piece. In the same measure the clarinets enter, the time signature briefly changes to 3/4 for one measure, then back to 5/4. The sudden shift in time meter undermines the already dubious stability of the piece, leading towards eventual breakdown. As the horns belt out a melody in their most piercing octave, clashing with the bassline and the repeating motive, the piece seems about ready to burst. As the musical phrase ends, the piece undergoes another sudden shift, this time in tonal center. *Triton's* key ascends from B-flat to D-flat, prolonging the musical tension. However, the horns resolve their melody in the key of B-flat irrespective of the change to D-flat, creating a stark dissonance with the rest of the ensemble. The rest of the ensemble embraces dissonance completely, ascending together toward a climax.

On the verge of a musical breaking point, the piece again delays releasing the tension with another musical episode. The ensemble returns to a soft dynamic level as the bass and repeating lines drop out, creating a fleeting sense of disorientation. As the new musical landscape comes into focus, the image of Neptune again appears, illustrated by quoting *Triton's* introduction. This scene indicates the arrival of Triton at the Neptunian system. The woodwind section painting this picture of Neptune sit directly in front of the audience, spatially representing Neptune in the foreground of the musical moment. However, in this iteration of Neptune material, a foreign bass line appears, followed by a foreign melody, all scored with heavy dissonance. The deep bass notes emerge like the shadow of Triton growing over Neptune's surface, a solar eclipse spelling doom for the Neptunian system. As the piece again begins to increase in volume, the impending collision becomes inevitable. In one last breath, the entire ensemble drops out except for two trumpets and two trombones. The trumpets and trombones sound the same notes both forwards and backwards as if they were mirror

images of each other. This melody briefly depicts both perspectives of Neptune and Triton, facing each other head-on before the clash.

“The Clash”

As Triton enters the Neptunian system, its gravity poses a massive threat to Neptune’s ancient moons. To illustrate Triton’s gravity entering the system, the tuba plunges from the extreme high end of its range to the low contrabass register in a dramatic gesture. In effect, the severity of the jump in register through the tuba itself creates a “wub” sound, like the hull of a giant cruise ship creaking under immense pressure. In the context of *Triton*, the “wub” of the tuba combined with the introduction of the thundering bass drum, tam-tam, low brass, and low woodwinds create the sense of a Triton’s overwhelming gravity ripping at Neptune’s moons. At the same time, the higher instruments ascend contrary to the motion of the bass voices, only to arrive at increasingly dissonant harmonies. The woodwinds proceed to trill furiously, obscuring any arrival point. Instruments crescendo and decrescendo at different times in waves of chaos. The piccolo and E-flat clarinet shriek in their most piercing upper range while the bass trombone and contrabassoon roar far below. Like in “The Kuiper Belt,” the time signatures change, and the melody and basslines work against each other. All of the musical elements in “The Clash” aim to illustrate the catastrophe of Triton’s gravity destroying Neptune’s moons.

Out of the chaos, the ensemble finally arrives together in a climax and gradual descent from the apex. The trombones accentuate the moment with a nasty glissando in their lowest register, a scar left in the listener’s ear from the carnage. As the winds drop out, the percussion delivers an exclamation point to the end of “The Clash” with a loud bang reminiscent of the beginning of “The Kuiper Belt.” The natural decay of the percussion sound allows the piece to fade into the following section, “The Ring.”

“The Ring”

The final section of *Triton, the Rogue* differs significantly from the previous sections to illustrate Triton’s transformation by “The Clash.” To communicate Triton’s alteration musically, only small fragments of recognizable melodies survive “The Clash.” For example, the final trombone glissando motive from “The Clash” passes along to the saxophone section, carrying the melody and developing it to the end of the piece. Additionally, the crotales maintain the presence of the tritone in “The Ring,” although the crotales play the tritone melodically instead of harmonically as established earlier in the *Triton* by the trumpet fanfare. While several elements from previous sections of *Triton* remain, “The Ring” develops fresh material such as introducing a new motive in the flute, oboe, and piano.

“The Ring” aims primarily to convey the beauty of Triton’s final stage in its planetary lifespan, the ring surrounding Neptune. Compared to previous sections of *Triton*, “The Ring” features pleasant, consonant harmonies and hardly any harsh bass sonorities. The tonal center and key, G-flat major, remain constant to the end of the piece while the time signature, too, persists without change. The combination of more stable harmonies, constant key and meter, and avoiding of harsh sounds implies the stability of “The Ring.”

Triton, the Rogue ends as the crotales recall the tritone, presented in melodic form. The crotales blend harmoniously with the saxophone choir, gently fading away into the distance. In Triton’s final breath, the trumpet motive from “The Kuiper Belt” subtly returns, paradoxically reminding the listener of Triton’s dark and distant past in the midst of the radiant harmony.

CHAPTER IV: *TRITON, THE ROGUE* FOR WIND ENSEMBLE

Please see attached musical score and audio recording.

CHAPTER V: CONCLUSION AND FUTURE PLANS

I hope *Triton, the Rogue* inspires a cross-curiosity between science and music, motivating someone interested in science to learn more about music or encouraging someone interested in music to learn more about science. And, if someone is not interested in either field, I hope they are moved by the interesting intersection between science and music portrayed in *Triton, the Rogue*. In the end, as a storyteller and artist, I aim to share my excitement for discovering facts about the universe's mysteries with others through my chosen artform of music composition.

Additionally, I plan on expanding *Triton, the Rogue* to become a multimedia project, incorporating visual media and publishing the work on its own website. In an online format, I can more easily share this thesis with the greater academic community, musical world, and the public. Furthermore, on a website, I can display the text from my thesis, embed an audio player of the recording from the UT Wind Symphony of the musical composition, and play a video animation of Triton to complement the music. Viewers of the website can read about Triton's former status as a dwarf planet, its collision with Neptune's orbit and the Neptunian moons, and Triton's capture by Neptune's gravity. After reading about it, online visitors can listen to Triton through the harmonies of the woodwinds, the fanfares of the brass, and the thunder of the percussion. The audience would experience this musical interpretation of planetary bodies colliding while watching a video animation simultaneously. I believe with the help of collaborators found in the UT community and funding from the Plan II Thesis Grant, I can accomplish the goal of transforming this thesis into a multimedia website.

In regard to future compositions, I wish to expand *The Moons* into a four-movement suite, building on the two pieces I have already composed, *Triton, the Rogue* and *Titan, the Bold* (representing Saturn's moon). Additional movements may include *Phobos, the Feared* (depicting the moon of Mars) and *Moon, our Serenity* (portraying Earth's own moon). However, I also plan on exploring alternate

methodologies for composing the various moons such as a quantitative approach instead of a qualitative one. For example, *Triton, the Rogue* heavily focuses on the narrative connecting the scientific facts behind the moon Triton. As a change of pace and new compositional challenge, I wish to research data-driven techniques of converting scientific information into musical language such as spectral composition and computer-assisted composition.

Works Cited

- Head, Raymond. "Holst - Astrology and Modernism in 'The Planets!'" *Tempo*, no. 187, 1993, pp. 15–22.
- Holst, Gustav. *The Planets Suite for Large Orchestra* op. 32. 1914-16. London, England: Goodwin & Tabb, 1921. Musical Score.
- Masters, Adam et. al. "Neptune and Triton: Essential pieces of the Solar System puzzle." *Planetary and Space Science*, 6 Jun. 2014, pp. 104.
- Nogueira, Érica Cristina et. al. "Reassessing the origin of Triton." *Icarus*, 214, Jul. 2011, pp. 113-130.
- Renshaw, Jeffery. "A Brief Historical Perspective of the Wind Band." *The University of Tennessee Chattanooga Music Department*. N.d.

BIOGRAPHY

Austin Ali (b. 1997) is an international award-winning composer, trumpet player, and conductor from Dallas, TX. His music has been performed and recorded by numerous musical ensembles including the Austin Symphony Orchestra, Spanish Brass, the University of Texas Wind Ensemble and Wind Symphony, and the University of Texas Trombone Choir. Austin is in his fourth year of undergraduate studies at the University of Texas at Austin pursuing degrees in Music Composition and Plan II Honors. Austin's primary composition teachers include Yevgeniy Sharlat, Donald Grantham, Russell Podgorsek, and John Mills.