Graduate Comprehensive Exam for Brett Copeland

In partial fulfillment of the Master of Music – Tuba Performance Degree

University of South Florida – College of The Arts

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A College Tuba Repertoire Compendium:

A Response to Professor Jay Hunsberger's prompt

in partial fulfillment of the Graduate Comprehensive Exams for the Master of Music Degree at the University of South Florida

Brett Copeland

Abstract

This document will provide a repertoire compendium for a college tuba student. This document will cover repertoire for freshman tuba players through graduate students. The areas of etude and method books, solo repertoire, excerpts, and other literature will be covered within this document. Special attention to progression of difficultly and the amount of variety has been given to these lists. It assumed that these lists are additive, meaning a student that is currently a senior will have all the materials covered in the freshman, sophomore, and junior levels.

Etude and Method Books

This section contains etudes books that students should study, bring into their lessons, and perform. It is assumed that the students will work from all of the suggested texts over the course of the year, though, not necessarily at the same time.

Entries are listed alphabetically in the following format:

Name of composer – Name of publication – Publisher – Edition (if applicable)

Here I will describe the importance of the particular work to a student's development.

Freshman

Arban – Complete Method for Tuba – Encore Music Publishers – Edited by Jerry Young and Wes Jacobs

This method book includes Arban's full array of technical and musical exercises designed to develop every aspect of brass performance, and contains updated pedagogical commentary. This book has been used to establish and build-upon fundamentals associated with brass playing. It is a necessary set of exercises for young players.

Blazhevich – 70 Advanced Etudes, vol.1 – Robert King Music Company

This set of etudes is a staple for any tuba player. The etudes focus on a variety of styles and encompass all keys. They are adapted from the original etudes written for trombone. This is a standard book of etudes for the tuba.

Bordogni – Complete Vocalises for Tuba – Encore Music Publishers – Wes Jacobs edition

Legato playing is a paramount for any brass player. These etudes focus on the art of playing lyrically and with a warm and beautiful sound. These etudes are important for all levels of tuba players.

Kopprasch – 60 Selected Studies – Robert King Music Company – Tuba edition

These etudes are originally for low horn but have been adapted to numerous brass instruments. The etudes focus on technical playing while always producing a beautiful sound.

Sophomore

Grigoriev – 50 Studies for Tuba, vol. 1 – Encore Music Publishers – Edited and Annotated by L. Keating Johnson and Wesley Jacobs

These etudes focus on low-register playing in al key areas. They range from lyrical to technically challenging with complex meters. This book works well with students that have already displayed a good sense of fundamental tuba playing.

Snedecor – Low Etudes for Tuba – Alphonse Leduc

These 19 studies for the low register of the tuba have become a standard because of their supreme musicality and its extreme use of low range. This book should be used for young players that show a solid foundation and already posses a warm and centered sound on the contrabass tuba.

Sheridan and Pilafian – The Brass Gym: A Comprehensive Daily Routine for Brass Players – Focus on Music – Tuba edition

This is a good resource for establishing a healthy and productive daily routine of exercises. The more students can depend on themselves for prescribing what they should include in their warm-up the better off that student will be.

Junior

Bach (arr. Bixby and Bobo) – Bach for Tuba vol. 1 – WIM

This book serves two major roles in the development of a mature tuba player and musician. It exposes the young musician to the music of Bach and the Baroque era and forces the tubist to play in the correct styles using the correct ornamentations. This book should not be used until the student displays mastery of fundamental techniques, scales, and technical studies.

Tyrell, H.W. – 40 Advanced Studies for Bb Bass – Hal Leonard

These etudes are originally for trumpet and have been adapted for tuba. They range in difficultly and can serve as a good sight-reading material and provide pedagogical teaching points for young to advanced players.

Senior

Davis – 20 Minute Warm-Up –Hip-bone Music – Tuba editions

This collection of daily warm-up exercises is particularly useful for focusing on fundamentals while also playing in tune with the accompanying CD. The exercises are not difficult for an advanced player but they are important and reinforce good practicing habits.

Maenz, Otto – 12 Specialized Studies for Tuba – Friedrich Hofmeister

This collection of etudes focuses on contemporary compositional techniques and challenges the player to use their ear and listen for intervals and melodic content they may not be used to. This is a supplemental set of etudes that work best when employed as a contrast to lyrical and legato playing.

Graduate

Sass, Jon – The Jon Sass Bass Line Book – Editions BIM

This book breaks down bass lines heard on Jon Sass' album recordings. The CD accompaniment walks the player through various rhythmic exercises and style exercises geared towards shaping a more versatile and well-round bass player. This book is especially helpful for students interested in jazz, popular, or commercial music.

Reynolds, Verne – 48 Etudes for French Horn – G. Schirmer – Tuba edition

This book contains 48 “impossible” etudes that are a challenge for any brass instrument. The etudes focus on different areas of brass playing that are inherently difficult like: large leaps, irregular time signatures, strange melodic intervals, and varying range.

There are numerous etude and method books that have been left off this list. There were not included because they were not included only to keep this list concise and focused.

Solo Literature

This list of solo literature is intended to challenge the student in a realistic way depending on their skill level and grade level. For every grade level there is spectrum of difficulty to meet the needs of all players in that grade.

Entries are listed alphabetically in the following format:

Name of composer – Name of work and instrumentation – arranger (with applicable) – Publisher

Here I will describe the importance of the particular work to a student's development.

Freshman

Arnold, Malcolm – *Fantasy for tuba* (unaccompanied) – Faber Music Inc.

This piece serves a good introduction solo unaccompanied playing on contrabass tuba. With modest range requirement the performer can focus on playing with a good sound while navigating through the fantasy and variations.

Grant, James – *Stuff* for unaccompanied tuba – Potenza Music

This theme and sevens variations is great for younger players as an introduction to unaccompanied playing on the contrabass tuba. The piece is not very demanding technically so there is a great opportunity for the student to focus beauty of sound and clarity. The student is required to create a great deal of contrast between the variations. There are a few instances of extended techniques and non-standard notation, which are important for students to see and understand.

Hartley, Walter – *Suite for unaccompanied tuba* – Theodore Presser Company

This four-movement work is often used as an introduction to unaccompanied playing on contrabass tuba. It uses traditional notation and places demand on the performer to create contrast between movements.

Koetsier, Jan – *Sonatina for tuba and piano* – Edition Marc Reift

This piece is often performed on the contrabass tuba but can be played on bass tuba. It uses a classic sonata form and gives the student a chance to play lyrically and expressively while containing a number of rapid technical passages.

Lebedev, Alexej – *Concerto in one movement for tuba and piano* – Edition Musicus

This is a very lyrical and dramatic work for either bass or contrabass tuba. The student has the opportunity to play lyrically, technically, and virtuosic in the cadenza.

Marcello, Benito – *Sonata No.1 in F Major* – arr. for tuba and piano by student

This work can be performed either on bass tuba or contrabass tuba. The four-movement work gives the student contrasting styles to play in without too much demand on their range.

Vaughan Williams – *Concerto for Bass Tuba in f minor* for tuba and piano – Oxford University Press

This is a standard work for bass tuba that students need to be familiar with. It is a very conservative work and is very popular on professional auditions. The first movement uses a lot of the range of the instrument and is more technical in nature. The second movement is very lyrical and expressive. The third movement includes a lot of trills and rapid passages. The concerto can be approached by a wide spectrum of students: from high school students to graduate students.

Sophomore

Bach, J.S. – *Six Suites for unaccompanied violoncello* – arr. by Joseph Malkin – Carl Fisher

The Bach cello suites are a great challenge in unaccompanied playing for any musician. These can be played on either bass or contrabass tuba. They expose students to styles that they may not be familiar with, ornaments not common in tuba music, and phrases that need to be adapted to fit the performers capabilities. This work is intended for players that have a solid foundation and have a keen interest in solo playing.

Gregson, Edward – *Tuba Concerto* – Novello

This is one of the most performed works for tuba and piano. It is approachable by high school students through senior undergraduate students on either bass tuba or contrabass tuba.

Hindemith, Paul – *Sonata for Bass Tuba and Piano* – Schott

This is a standard piece in the solo bass tuba and piano repertoire. Odd meters, very complex ensemble playing in the second movement, and a difficult quasi-cadenza in the third movement makes this piece both challenging and satisfying for any tuba student. Advanced high school students through graduate students find value from working on this standard piece in the tuba repertoire.

Persichetti, Vincent– *Serenade No. 12 for unaccompanied tuba* – Elkan-Vogel

This standard piece for solo tuba is in six movements. The piece requires the student to pay special attention to each movement in order to define its character. The work is normally performed on contrabass tuba and presents challenges with range, articulations, and rapid technical passages. This piece is meant for advanced young students.

Stevens, John – *Triumph of the Demon Gods* for unaccompanied tuba – Editions BIM

This contrabass tuba solo is a highly programmatic work that encourages the student to convey a story while performing. The piece heavily emphasizes the use of the middle to lower register of the instrument. The piece is meant for advanced young students.

Vaughan Williams, Ralph – *Six Studies in English Folksong* for tuba and piano – J.W. Pepper

This standard piece can be performed on bass or contrabass tuba. The different movements range from very expressive and lyrical to quick and agile. This is a good piece for a young student to be introduced to working with a pianist. This piece can be attainable for high school students through senior undergraduate students.

Wilder, Alec – *Suite No. 1 "Effie" for tuba and piano* – Margun Music

This piece is a staple in the tuba repertoire because of its distinct character and melodies. It can be performed on either bass or contrabass tuba. The piece encompasses almost all facets of tuba playing: lyrical, technical, bombastic, etc. The student should strive to create as much contrast as possible between the six movements. The piece is approachable for freshman undergraduate students through graduate students.

Junior

Baadsvik, Oystein – *Fnugg* for unaccompanied tuba – Cimarron Press

This is a quasi-improvisational piece that includes the use of multi-phonics and vocal percussion sounds. This can serve as an introduction to certain extended techniques and un-conventional notation. The piece is not terribly demanding for a student with solid fundamentals and experience with extended techniques.

Bernstein, Leonard – *Waltz for Mippy III* for tuba and piano – Boosey and Hawkes

This solo is meant for intermediate players and uses the upper tessitura of the horn in a jazz style. No great demand on the performer in terms of rhythm but this may present unique challenges to students unfamiliar with the style.

Gregson, Edward – *Alarum* for unaccompanied tuba – Intrada Music Publications

This is a one-movement work for bass tuba that exploits both the upper and lower ranges of the instrument. There are a few instances of flutter tonguing and *glissandi*. This is a moderately difficult work that places high demands on the performer.

Penderecki, Krzystof – *Capriccio* for unaccompanied tuba – Schott

This is a very well known and difficult piece by an even better known composer. Students serious about studying music beyond their undergraduate degrees need to be aware of this work. The piece is unmetered and forces the student to make decisions about phrasing, style, and pacing of the work.

Plog, Anthony – *Three Miniatures for tuba and piano* – Edition BIM

This is bass tuba work includes rapid passages in unusual meters. It has been a staple for tuba players ranging from advanced undergraduates to graduate students.

Strauss, Richard – *Horn Concerto No. 1* arr. for tuba and piano – IMSLP

This is a classic work that works nicely on the bass tuba. It presents challenges to the student that they may not get from pieces originally written for tuba. This work is approachable for undergraduate students through graduate students.

Wilhelm, Rolf – *Concertino for tuba and piano* – Tuba Center

This piece works nicely for the bass tuba and includes a few rapid technical passages. The overall level of difficulty is not high.

Senior

Bach, J.S. – *Partita in a minor for flute alone* – arr. Floyd Cooley (or the student)

This piece works very well on bass tuba and forces the student to make stylistic choices in order to make it work for them. The differences in style between movements, the long phrases, and sequential patterns through various keys make this piece challenging and worthwhile.

Baker, Claude – *Canzonet for solo tuba* – Southern Music Company

This unaccompanied work contains complex rhythms and a quasi-improvisional aspect to it. There are a lot of technical demands put on the performer and uses extensive range for the bass tuba. This works well for advanced undergraduate students and graduate students.

Bozza, Eugene – *Concertino for tuba and piano* – Alphonse Leduc

This is a very challenging work for bass tuba. It includes rapid passages throughout all registers of the instrument and complex ensemble playing. This challenging work is meant for advanced students serious about performance.

Grant, James – *Three Furies* for solo tuba – Potenza Music

This piece is very difficult and involves very wide leaps throughout all registers of the bass tuba, very rapid passages, complex rhythms, and a couple instances of half-valve glissandos. This challenging work is meant for advanced students serious about performance.

Kraft, William – *Encounters II for solo tuba* – Editions BIM

This work has become a standard for solo tuba. It is extended techniques to define variations on a theme. The work uses extreme range, extended multi-phonic passages, half-valve glissando and flutter tonguing. This challenging work is meant for advanced students serious about performance.

Lang, Istvan – *Aria di Coloratura for solo tuba* – Edition Musica Budapest

This one movement work is broken into different sections by tempo changes. There are many different styles presented in the work that the student needs to identify. The work includes the use of multi-phonics, unmetered tremolo with tonguing, trills, extensive flutter tonguing, and extreme range leaps.

Plau, Arild – *Concerto for tuba and string orchestra* – Ovation

This is a very challenging bass tuba piece that relies on the student playing lyrically in the upper register of the instrument of the horn. This piece is meant for an advanced player.

Williams, John – *Tuba Concerto* for tuba and piano – Hal Leonard

This is a standard bass tuba and piano work that challenges to the student to play gracefully through the agile and demanding solo part with clarity. This is a work meant for advanced students serious about music performance.

Graduate

It is strongly encouraged that graduate students choose pieces on the list that they have not played. By this point in the student's career they should know what pieces they need to play and why they should be playing it. It is also highly encouraged that the student finds his or her own niche within the world of tuba playing. That can include performing new works for tuba, performing with electronics, making and performing transcriptions of music written for other instruments, or chamber music. It is also very encouraged that the student seeks out composition students to write pieces for them.

Aho, Kalevi – *Concerto for tuba and orchestra* – Boosey and Hawkes

This is an extremely challenging concerto for bass tuba. There is extreme use of the upper register of the instrument, extended techniques, and complex rhythms throughout the work.

Cope, David – *BRTB* for solo bass trombone (or any brass instrument) – Editions BIM

This is a theatrical piece that forces the student to move around the stage and perform using almost entirely extended techniques and unconventional movements. This kind of work is important for the modern day musician.

Harvey, Jonathon – *Still* for tuba and electronics

This piece is performed using a MAX patch and employs non-standard notation. The pacing and direction of the piece is left up to the discretion of the performer. The student will need to learn how to run the electronics and perform an event-based real-time electronic processing piece.

Kagel, Mauricio – *Mirum* for unaccompanied tuba – Universal Edition

This work by a globally recognized composer is important because of its style of notation and performance. It is mainly performed on bass tuba. It is up to the performer to determine the pacing and direction of the piece.

Lang, David – *Are You Experienced?* for solo electric tuba and chamber orchestra

This is an extremely challenging work for the tubist. Both bass and contrabass tuba is used. The performer is amplified and the tuba is run through live-effects processors.

Nono, Luigi – *Post-praeludium-per-donau* for tuba and electronics – Presto Classical

This work uses non-standard notation and requires in-depth knowledge of performing with electronics. The piece uses extended techniques like multi-phonics, breath noises, and valve shaking.

Powell, Morgan – *Midnight Reveries* for solo tuba – Brass Music

This bass tuba solo uses proportional notation as well as traditional notation. The avant-garde nature of the piece requires the student to practice and master the extended techniques used in the work.

Reck, David – *5 Studies for solo tuba* – Edition Peters

This work is performed either on contrabass or bass tuba. The piece calls for extreme register leaps, use of extended techniques, and forces the student to read different styles of notation between movements.

Excerpts

The majority of these excerpts can be found online for free on IMSLP or Abe Torchinksy's collections, which are available through Encore Music Publishers. In addition to learning the specific excerpts it is assumed that the student will become familiar with the entire work and other works by that composer.

These excerpts are found on most orchestral and graduate school audition lists. The more a young student can do to become familiar with this music as they begin their undergraduate studies the better off their musical ideas about the music will be. The excerpts are intended to help establish a beautiful and big contrabass and bass tuba sound.

Freshman

Prokofiev – Symphony No. 5 (1st mvt. reh 3-6)

Wagner – Overture to Die Meistersinger von Nürnberg (reh. J-L)

Wagner – Ride of the Valkyries

Sophomore

Berlioz – Hungarian March

Gershwin – An American in Paris

Mahler – Symphony No. 1 (3rd mvt.)

Junior

Berlioz – Symphonie Fantastique

Hindemith – Symphonic Metamorphosis

Mahler – Symphony No. 2 and 5

Senior

Berlioz – Romeo and Juliet (Recitative)

Holst – Planets (Jupiter and Uranus)

Mussorgsky/Ravel – Pictures at an Exhibition (Promenade/Bydlo/Great Gate of Kiev/Baba Yaga)

Respighi – Fountains of Rome

Sousa – Stars and Stripes Forever

Stravinsky – Petrouchka (Bear solo)

Also included: any orchestral or military band audition requirements. It is assumed that the student will be taking or preparing for these auditions at this point in their career

Graduate

Bruckner – Symphonies 4,7, and 8

King – *The Melody Shop*

Prokofiev – Romeo and Juliet Suite No. 2 (Montagues and Capulets)

Strauss: Ein Heldenleben and Till Eulenspiegel

Wagner – Overture to Act III of Lohengrin

Other Materials

Freshman students will be required to purchase and write in a journal that they will keep throughout their academic career. They will write in it weekly and take down notes from their lesson, write down assignments for future lessons, and reflect upon their experiences.

This list contains extra materials that are suggestions for students to read and discuss outside of their tuba studies that may not directly relate to the instrument but certainly relate to their musicianship.

Freshman

The Tuba Family – Clifford Bevan

Arnold Jacobs: Song and Wind – Brian Frederikson

Sophomore

The Inner Game of Tennis – Timothy Gallwey

The Talent Code – Daniel Coyle

Junior

The Savvy Musician – David Cutler

Effortless Mastery – Kenny Werner

Senior

The Four-Hour Work Week by Tim Ferriss

Zen and the Art of Motorcycle Maintenance – Robert M. Pirsig

Conclusion

With this document I have tried to create a repertoire compendium that could be used in a college or university setting to help sculpt a well-rounded tuba player. Though the lists are not all inclusive, and certain pieces were left out that could be on the list, I have tried to cover all the major areas of the tuba repertoire. These lists were intended to include as many genres, styles, and musical periods as possible.

References

Ford, A. (2013). The modern tuba player's list of orchestral excerpts. Retrieved April 6, 2016, from http://uclatubas.weebly.com/uploads/1/4/4/3/1443288/the_modern_tuba_players_list_of_orchestral_excerpts.pdf

Morris, R. W., NetLibrary, I., & Perantoni, D. (2006). Guide to the tuba repertoire the new tuba source book. Bloomington, IN: Indiana University Press.

A Discussion of Three Concertos Written for Tuba and Orchestra After the Year 2000: A Response to Dr. Wiedrich's prompt

in partial fulfillment of the Graduate Comprehensive Exams for the Master of Music Degree at the University of South Florida

Brett Copeland

Abstract

In this paper I will be discussing three concertos for tuba and orchestra written since the year 2000. They are: David Carlson's *Tuba Concerto for double string orchestra and harp*; Samuel Jones' *Concerto for tuba and orchestra*; and Kalevi Aho's *Tuba Concerto*. All three of these works were written to be performed on bass tuba and showcase the tubas ability to play lyrically as well as technically. In addition to discussing the pieces I will provide a brief overview of tuba concertos written before 2000, discuss compositional techniques used, and discuss how the capabilities of the instrument have been showcased in these works.

In 1954 Philip Catelinet premiered Ralph Vaughan Williams' *Concerto for Bass Tuba in f minor* with the London Symphony Orchestra. Since then there has been a flourishing of the concerto for the tuba. Composers like: Edward Gregson, Bruce Broughton, John Williams, and Rolf Wilhelm have written tuba concertos for various accompanying ensembles. These concertos have become very popular in the tuba community because of their clear form, challenging but rewarding nature, and their playability by players of all levels. Some other, under-played yet musically interesting concertos for tuba are Helmut Lachemann's *Harmonica* for tuba and orchestra from 1981, which relies heavily on extended techniques and contemporary compositional techniques; Joseph Ott's Concerto for Tuba with Tape from 1974; and John Stevens' *Journey* for tuba and orchestra, which was written for CC tuba and premiered by Gene Pokorny and the Chicago Symphony Orchestra in the year 2000.

There are a number of problems with the concertos written for tuba and a number "holes" in the tuba repertoire. One major issue is a lack of stylistic diversity in concertos that are commonly performed. Most tuba concertos written are in a neo-romantic style and do not fully utilize the sonic capabilities of the tuba. There has been a lack of extended techniques employed in tuba concertos, with the exception of Lachenmann's *Harmonica* from 1981. Another issue is the lack of literature for the contrabass tuba. The majority of concertos have been written for the bass tuba while the contrabass tuba, while very capable of melodic and soloistic playing, is left in the back of the orchestra.
The concertos discussed in this paper are filling in some of the gaps that have been created by tuba concertos written before 2000 and hopefully more of those gaps are filled in in the near future.

David Carlson – *Tuba Concerto for Double String Orchestra and Harp* (2014)

David Carlson was born in 1952 and is originally from California. Carlson has written numerous operas, orchestral works, concertos for cello and violin, chamber music, and vocal pieces. Carlson's *Tuba Concerto* was premiered by tubist Jay Hunsberger and the University of South Florida Symphony Orchestra in the spring of 2015. The piece was the result of long and quasi-secret commissioning project between the composer, Jon Partridge (Hunsberger's partner), and eventually Jay Hunsberger. Partridge and Carlson spoke about writing a piece for Hunsberger that highlighted the strengths of both the tuba and Hunsberger. Thoughts about instrumentation for the accompaniment ranged from tuba and piano to tuba and orchestra. Carlson was interested in composing a piece that let the tuba sing like a voice and stayed away from some of the flashy and abrasive sounds the tuba is capable of making. Another goal for Carlson was to create a piece that could become a part of the tuba repertoire.

The result is a concerto that both sings like very few pieces for tuba do and shows off the technical facility that is not easily achievable by most brass instruments. In addition to being scored for double string orchestra and harp the piece is also available for tuba with piano accompaniment. This concerto, like most concertos for tuba, was written for bass tuba. The piece creates a lush neo-romantic atmosphere that gives the tubist the opportunity to be expressive, expansive, and extremely musical.

The concerto is in two movements: I. *Andante Affetuoso* and II *Allegro Vivo*. The first movement is very lyrical and expressive, reminiscent of the human voice. The piece begins in 6/8 and the dotted-quarter notes equals 66. Throughout the movement there are numerous meter sifts but the tempo remains constant until the second theme is presented.

The interval of the perfect fifth is the foundation of the opening theme. The theme is presented in numerous keys and it always begins with the perfect fifth. As far as harmonic language is concerned the piece employs pentatonic scales, whole-tone scales, and octatonic scales. The melody is long, at times meandering, and focuses on consonant leaps with a *molto-legato* style of articulation. The melody constantly flows between the soloist and the orchestra. The rhythmic content is relatively simple, very few complex rhythms or irregular tuplets, and constantly switches from triple to duple. It frequently juxtaposes the feeling of duple against triple between the soloist and the orchestra. The movement is in sonata-allegro form where the first section is legato and flowing and the second movement is more rigid and employs dotted-eighth sixteenth-note rhythmic figures. The first movement comes to a close after the final statement of the opening theme expands into the upper register of the tuba. Carlson makes use of the large range of the instruments and is very careful about his orchestration when the tuba is in the lower register of the horn, which is notorious for being easy to get covered up. At times Carlson writes large leaps for the soloist that sends the tuba soaring into the upper register of the horn. This is quite effective because the tuba is generally in the lower register at a quiet volume with a crescendo leading up to the leaps.

The second movement is a stark contrast to the first movement. The movement opens with a mixed meter (7/8) folk-like dance at a much quicker tempo that spreads from the orchestra to the tuba. The tuba part contains quick trills, large agile leaps, and demands both the soloist and the orchestra to play with a sense of rigid precision. The movement slowly ramps up in intensity by increasing in volume and the density of rhythmic figures. As the movement develops the m3 and M3 interval asserts itself as the

main melodic interval. As the tuba begins the assent to the upper register of the horn, it does so by playing sequential thirds. The rhythmic content in this movement is more complex than the first movement. The meter shifts frequently from 7/8 to 5/8 to 3/8 and others. A direct repeat of the beginning of the movement occurs and leads to a recapitulation of the opening theme heard in the first movement. The piece ends with a coda that re-emphasizes the use of the third and sends both the tuba and the accompaniment soaring towards the double bar line. Carlson exploits the extreme upper register of the tuba and just as quickly sends the tuba down to the bottom of the piano. The piece ends with the tuba playing ascending chromatic passage with harsh interjections by the accompaniment and ends with the tuba descending back to its normal place in pitch space.

This piece puts demands on the tuba that have rarely been presented. It showcases the tuba's ability to play lyrically in the upper register of the horn, playing delicate technical passages, and have the endurance to end the twenty plus minute concerto with a flurry of notes. Carlson did a great job by writing a piece that showcases the tuba's ability to be melodic, agile, and always sonorous. At times it seems as though Carlson thought he was writing for a string instrument by including fast arpeggios, trills, and angular melodic contours. This concerto is a welcomed addition to the tuba repertoire.

Samuel Jones – *Concerto for tuba and orchestra* (2006)

Samuel Jones wrote his Tuba Concerto for Chris Olka and the Seattle Symphony in 2006. The piece was commissioned in memory of James Crowder by is wife Sandra. James Crowder was an aeronautical engineer that specialized in wind tunnels. In addition to being an engineer, Crowder was a tuba player and an avid supporter of the Seattle Symphony. After his passing, Crowder donated his tuba to Olka, who now lends the horn to his students at the University of Washington (Campbell, R.M. 2006). The piece was premiered January 5th, 2006, in Seattle and recorded by Chris Olka and the Seattle Symphony in 2009. The recording was released in 2009 on a CD that also included Jones' Symphony No. 3 on the Naxos label (Manheim, James 2009).

Samuel Jones first came into prominence as a conductor, one of the few Americans to advance through the ranks of the smaller American orchestras to become the conductor of one of the majors with the Rochester Philharmonic (Jones, Samuel 2015). He was the founding Dean at the Rice University Shepard School of Music. After 24 years severing as Dean, Jones stepped down but continued as Professor of Composition and Conducting as well as Director of Graduate Studies at the school he founded. In 1997 he retired from full-time academic life, and moved to the Seattle area where he was appointed by Gerard Schwarz as Composer in Residence of the Seattle Symphony, a position he held until 2013. His compositions include three symphonies and many other orchestral works, as well as works for chorus and orchestra, opera, and chamber groups.

Samuel Jones studied composition with Howard Hanson. Hanson was a composer, educator, and teacher who was a promoter of American classical music. At

the age of 28 Hanson was appointed to the Director of the Eastman School of Music. While there he presented over 1,500 new works by over 700 composers (Rodman, Michael).

Jones said about his early ideas for the piece that, “I didn’t want to write just a curio but a concert piece that calls for the soloist to posses the same kind of technique and musicianship required in many of the great concertos” (Campbell, R.M. 2006). The concerto focuses more on the tuba’s ability to play long and quiet lyrical passages in the first two movements. The movements are as follows: I. *Andante con moto*, II. *Andante mosso – Adagietto*, and the finale begins *Largo* before shifting to *Allegro molto*. An unusual effect in the finale is a wind tunnel sound, which was a tribute to James P. Crowder who worked with flow visualization of rapidly moving air on solid surfaces, as the notes relate (Keogh, Tom 2014).

The concerto opens briefly with the soloist playing a short melodic fragment but it immediately grows into an unexpectedly lyrical melody. In much of the concerto the tuba plays softly and as part of the ensemble, though as a prominent voice always.

The second movement showcases the amount of contrast in dynamic range the soloist can create. It begins with oboe foreshadowing the theme used throughout the movement. The tuba then enters with the theme over a bed of upper strings playing consonant harmonies. The movement uses a technique that Jones uses in his third symphony. Jones presents a short and quick motive that is first heard in the upper brass and immediately followed by a loud and dense chord in the brass, low strings, and percussion. After this idea the tuba responds with a short cadenza-like passage. The idea is presented again and is again followed by the tuba. The tuba then plays the short theme

by itself and expands upon it while being joined by the rest of the orchestra. Different sections of the orchestra then play the theme and every presentation is done by a lower instrument. The rest of the movement unwinds, still using that melodic material but augments the rhythms used and at a much lower pitch. The movement continues it's decent with the orchestra while the tuba foreshadows the opening theme of the third movement. The movement eventually slows to a halt, ending on an Ab major chord with the tuba playing a pedal Ab (Ab 0), highlighting the extreme range of the instrument.

The 3rd and final movement of this concerto is the musical representation of a wind tunnel coming to life. It appears to be a hybrid of both sonata and rondo form. I see this as the formal breakdown: A–B–A–C–AB (coda). A is the wind tunnel is activated and B is the cadenza section. The second cadenza section is interjected with various instrument groups playing. The C section is mainly a tuba and piccolo duet. Both instruments play the theme together with slight orchestral accompaniment. Also heard in this section is a Wagner quote where the tuba plays the horn call from *Siegfried* with sparse accompaniment. The final section of the movement combines both themes and showcases the facility and ability of the tuba. The piece goes out in a flurry of sixteenth note runs in the solo tuba part accompanied by bombastic accompaniment from the orchestra.

Some unique features with this concerto are the amount of duets and small group playing. The best examples are the first movement where the tuba and trumpet have a long dialogue with sparse orchestral accompaniment and the finale with the tuba and piccolo. Another unique feature is the amount of cadenza-like sections where the tubist is given the opportunity to add their own interpretations and musical ideas. Another

feature is the wind tunnel effect employed in the finale movement. This is achieved by having the orchestra begin playing in its lowest register and slowly playing an ascending chromatic line. The higher the tessiture gets, the faster the orchestra plays. Eventually the tuba is launched into the piece and plays it's nimble melody. The wind tunnel gesture is repeated a couple of times, with the final time leading the tuba to the double bar at the end of the piece.

The piece was commissioned and premiered by the Seattle Symphony Orchestra and Chris Olka but has since been adapted to be performed as a tuba with piano accompaniment. This piece is also good step in the progression of the instrument and a welcomed addition to the repertoire.

Kalevi Aho – *Tuba Concerto* (2000)

Kalevi Aho wrote his *Tuba Concerto* in 2000 and Harri Lidsle and the Lahti Symphony Orchestra premiered it in 2001. The concerto is in three movements: I. *Andante,* II. *Allegro – Cadenza – Tempo 1,* III. *Larghetto – Presto – Tempo I.* The work focuses heavily on the lyrical ability of the tuba, showcases the sonic capabilities of the instrument by including extended techniques in the third movement, and is overall a more symphonic work compared to other tuba concertos for both the soloist and the orchestra.

Kalevi Aho was born in 1949 in Finland, where he has remained. He is regarded as one of Finland's foremost contemporary composers. He spent numerous years teaching composition and musicology at both the Helsinki University and the Sibelius academy. In 1994 he left academia and began his career as a freelance composer. In that same year he received a fifteen-year grant from the Finnish State, which supported his freelance career. Aho's output focuses mainly on large-scale orchestral and choral works. He has written four operas, thirteen symphonies, three chamber symphonies, twelve symphonies, and numerous other orchestral and vocal works (Naxos 2016).

Aho's tuba concerto was premiered in 2000, forty-six years after the premiere of Ralph Vaughan Williams' tuba concerto by Philip Catelinet. When composing the piece, Aho wanted to focus on aspects of the tuba that have not been explored thoroughly and employed well. The compositional process was a close collaboration between Aho and Lidsle. Both parties were interested in creating a piece that was lyrical, explored all of the sounds the tuba can create, and was also engaging for the rest of the orchestra. The concerto was recorded by Oystein Baadsvik and the Bergen Philharmonic Orchestra

conducted by Andrew Linton and released on the BIS on March 27, 2007 (Eddins. Stephen 2007).

The concerto opens with a simple theme stated in the strings then in the tuba. In the first movement we hear a standard sonata-allegro form. The movement contains expressive playing in the tuba but doesn't push the soloist or the orchestra. The second movement is where this concerto begins to stray from traditional forms and sounds. The movement opens with woodwind motive that sounds eerily similar to the opening of Stravinsky's *The Rite of Spring*. The tuba and brass answer that motive with a driving motive that swells to create huge contrasts in dynamic and from there we are launched into a melodramatic dialogue between the tuba and the orchestra. Instead of a slow second movement Aho decides to let the tuba and orchestra soar through this movement. We hear the tuba explore more of the instruments range and technical capabilities with a lot of fast scalar passages. Following the adrenaline rush of that opening we come to a long and cleverly crafted cadenza from the tuba.

The third movement is the most interesting in terms of compositional technique. The movement opens with a dreary melody that sits in the low range of the bass tuba. This dirge-like section is beautifully orchestrated and allows the tuba to play in its lowest register and not be covered up, which is a very common problem. The accompaniment begins with just the cello and bass section and as the tuba climbs out of it's low range the orchestra does the same. This ascent in both the tuba and the orchestra comes to fruition with an awakening of the woodwinds. The flutes and clarinets begin playing a whimsical and energetic passage that seems to bring the rest of the orchestra back to life. With the addition of percussion the piece reaches it's climax around the 5-minute mark when the

tuba opens up and plays a sorrowful and almost grotesque figure that leads to the use of flutter tongue. Shortly after things calm back down the tuba enters with short swells of multiphonics and vocal sounds in a quasi-duet with the English horn with percussion accompaniment. The piece comes to an end with the tuba playing yet another lamenting melody that encompasses the entire range of the instrument all the way down to the pedal notes that fall off the piano to the upper French horn range.

The orchestra does not just serve as accompaniment throughout this concerto. A lot of times the orchestra drives the melodic movement and in a few instances the brass and percussion create tidal waves of sound that launch the tuba into completely new sections of the piece. There are extended woodwind sections that allow the musicians in the orchestra a chance to add their own musicality to the piece.

One reviewer of the concerto was not a fan of the extended techniques used in the finale of the piece. Specifically, when speaking about the use of multiphonics the reviewer said it was, "…a gimmick I was hoping Aho would avoid, since it does invite mischievous onomatopoetic associations of the 'mating walruses' kind." (Fanning, David 2009)

Some characteristics that separate this concerto from other concertos, specifically the others discussed in this paper are: the nationality the composer (Finnish), the elevated role of the orchestra, and the use of extended techniques. This concerto includes flutter tonguing, percussive sounds created by the performers voice, and multiphonics. Unfortunately, the extended techniques do not establish themselves as critical thematic material and they do not elevate themselves passed the point of novelty. Part of this is caused by the placement of these sounds. Most of these sounds are not heard until

twenty-five minutes into the concerto and by then any new sound is heard only as a novelty.

Similarities between Concertos

After listening and analyzing these three concertos a number of similarities have been made apparent. All three of these concertos were written for bass tuba and exploit the sonorous and rich sound that modern bass tubas are capable of creating. The concertos showcase the immense range of the tuba, more specifically the upper register. All of the concertos have long sections of lyrical playing in the extreme upper register of the tuba, which then gets juxtaposed to the loud and bombastic lower register of the horn. Another similarity between the concertos is the collaborative process that the composer and the tubist had during the compositional process. All of these works were written for specific tubist with the hopes that the pieces will then become a substantial addition to the tuba repertoire.

One final similarity is the virtuosic nature of these works. Compared to early literature written for tuba these works are incredibly more difficult. This is a testament to tuba players commissioning new works from composers that are willing to push the limits of the instrument and the performers.

Conclusion

After listening, researching, and analyzing these three concertos written for tuba and orchestra since 2000 we see a greater appreciation for the lyrical and technical abilities of the tuba. The pieces highlighted in this paper are all written for bass tuba and exploit the sonorous and rich tone created by present day tuba players.

These works are contributing to the tuba repertoire in a meaningful way and will see more performances as time goes on. With the exception of the Aho, these concertos have also been adapted for tuba with piano accompaniment. Adapting these works to be played with piano rather than double-string orchestra or full orchestra gives these pieces a much higher probability of being performed. Since most students and young professional tuba player do not have access to those large ensembles the likelihood of them being able to perform the piece and share it with new audiences is very small, unless they are adapted for a smaller ensemble.

Moving ahead in time one would hope to see more major works written for tuba that break the standard concerto mold. There are major gaps that need to be filled in the repertoire and there are plenty of composers around to fill them. The use of electronics, prepared aspects of the tuba or extra implements used with the tuba, and the use of CC are areas that still need to be explored more thoroughly.

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Performing with Electronics

An introductory guide to equipment, software, and performance practices used in electro-acoustic performance

Brett Copeland

A Response to Dr. Sekhon's prompt

in partial fulfillment of the Graduate Comprehensive Exams for the Master of Music Degree at the University of South Florida

Table of Contents

Electronic Composition Genres

Within the genre of electronic music there a few different types of pieces that can be performed live. For the sake of this guide I will only be discussing electronic pieces that are performed without the use of a sound engineer, meaning the performer is the only person running the electronics.

Instrument + Tape

Instrument + Tape pieces require the least amount of electronic setup. These pieces have the option of being run by performers on stage or a sound engineer. The only electronic setup needed to perform these pieces is access to a sound system. Performers have the option of starting and stopping the electronic portion of the piece with any kind of digital audio player. This type of electronic music performance is also referred to as Karaoke. Karaoke is Japanese for “empty orchestra”.

Performer Triggered Electronics (Broken Tape)

This type of piece is very similar to Karaoke pieces. As the term implies, broken tape pieces take the tape part and divide them into different sections that are triggered by the performer. The only difference is that the performer is responsible for triggering different sections of the tape. The performer would typically use a MIDI controller to trigger the sections of the tape.

Real-Time Electronic Processing

Real-time electronic performance requires the most setup and equipment. With live or real-time electronic pieces the performer needs to have a microphone, an interface, a laptop or iPad, a MIDI controller, and access to a sound system system. Often with these pieces the performer is using a MIDI controller to send commands to the computer in order to perform the piece without physically interacting with the computer. More information on hardware and equipment can be found on pp. 11-14.

This category can be further broken down into Real-Time Electronics and Live-Electronics. The distinction between the two comes from who is operating the electronics for the piece. For the sake of this guide I will only be discussing performer operated electro-acoustic pieces, which fall into the category of Real-Time Processing.

Software

The software discussed in this guide is by no means a comprehensive list. The programs were discussed because they have an active online community and help forums available if you ever find yourself needing help with a problem. All programs discussed are available for both Mac and PC.

Pure Data

Pure Data is an open-source visual programming language created by Miller Puckette.

> "PureData enables musicians, visual artists, performers, researchers, and developers to create software graphically, without writing lines of code. PureData is used to process and generate sound, video, 2D/3D graphics, and interface sensors, input devices, and MIDI. PureData can easily work over local and remote networks to integrate wearable technology, motor systems, lighting rigs, and other equipment. PureData is suitable for learning basic multimedia processing and visual programming methods as well as for realizing complex systems for large-scale projects."[1]

PureData is performed using patches that contain all of the musical information. The performer can interact with the patch by using his or her computer or a MIDI controller. The number of ways to perform is almost as high as the amount of sonic possibilities.

PureData is completely free and available for both Mac and PC. More information and a downloadable version of the program can be found at: https://puredata.info/

MAX/MSP

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1 . Puckette, Miller. Pure data – pure data community. 2015 (cited April 6 2016).

MAX/MSP is a visual programming language that is used mainly by musicians and multi-media artists. MAX was also created by Miller Puckette and is very similar to PureData but includes more features. It is maintained and distributed by Cycling74, a San Francisco-based software company. In MAX the performer uses a patch that contains all of the electronic musical information to perform the piece. A unique feature with MAX is the ability to talk to a variety of different controller surfaces whether that is audio, MIDI controllers, DMX (lighting), or analog instruments. MAX/MSP also has a version built specifically for integration with Ableton Live. The collaboration between the two programs is called MAX for Live and allows MAX objects to be used in Ableton Live without running both programs and using up CPU.

MAX is available for both Mac and PC, with a few options for iPad as well. There are different licensing options with discounts available for students. You can get started with a free 30-day trial and purchase a year lease for less that $10 a month. More information can be found at Cyclcing74's website: https://cycling74.com/

Ableton Live

Ableton Live is music performance software, digital audio workstation, and musical sequencer that is used by a variety of different musicians. Ableton specializes in making live performance easy and quick to setup. There are two views or modes that can be used in Ableton Live. One is arrangement view, which is geared towards composing and arranging sounds. In this view the user is given a timeline where they can record audio, input MIDI, or edit audio samples. The other is session view, which presents your music in a way that allows you to easily manipulate, improvise, and construct your

performance. In this view the user's music is organized modularly into tracks and further broken down into individual clips. The user can choose to play/stop/loop a series of clips at the same time, one-by-one, or in different groupings determined by the user. Examples of both of these views can be found on p. 10.

Ableton Live is typically controlled in performance with a MIDI controller, in addition to a laptop. MIDI controllers built for use with Ableton usually contain a launchpad of some sort that is used to start/stop clips. They also include knobs and faders that can be mapped into the program to control any parameter the user wants.

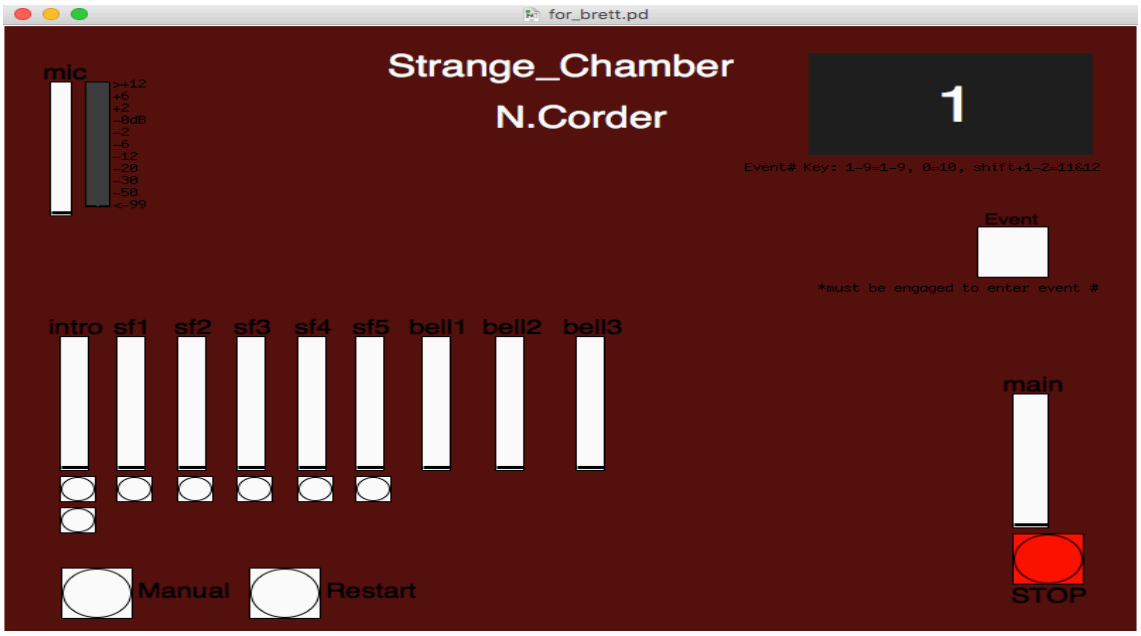
Ableton offers multiple purchasing options. Users can start with the Standard package or the Suite (standard being less expensive of the two). Education discounts are available at Ableton.com

More information can be found at Ableton Live's website:

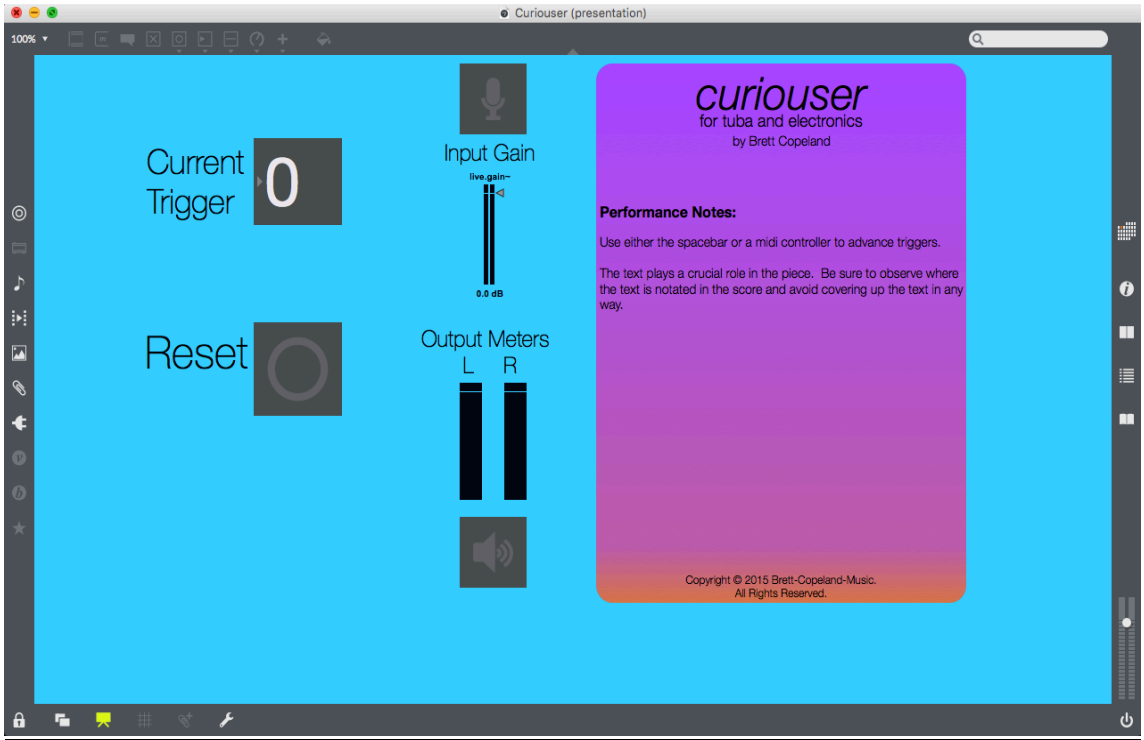
https://www.ableton.com/en/

Visual Examples of Software

PureData Patch – Graphical User interface for Nathan Corder's *Strange Chamber*

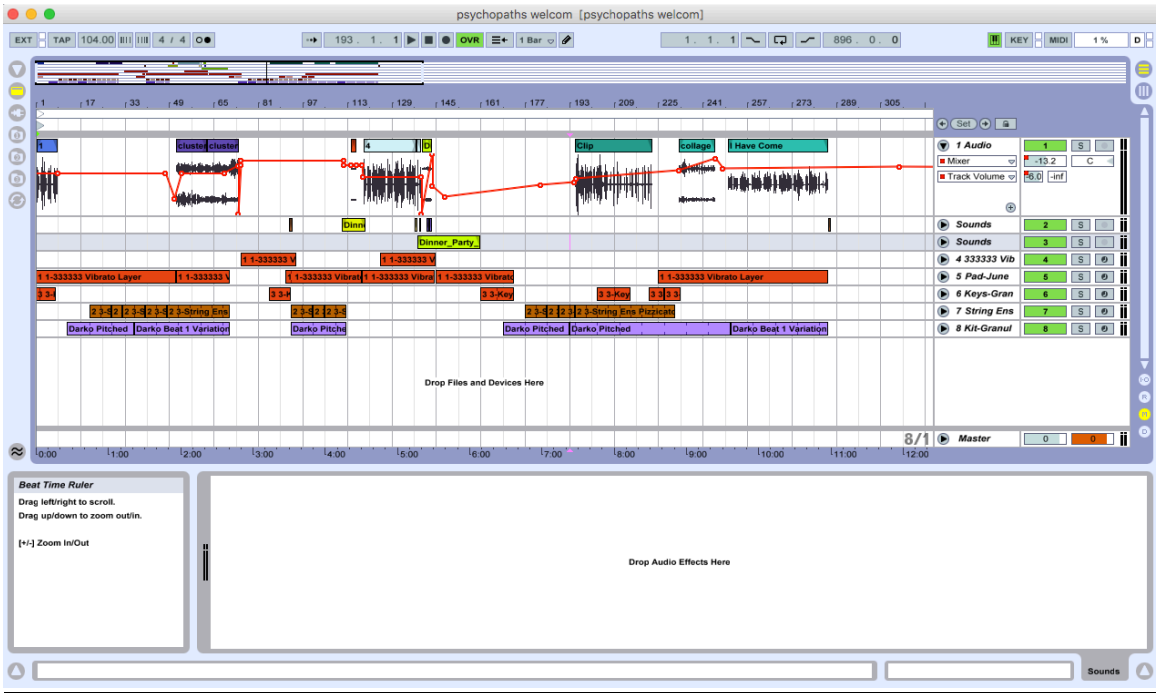


MAX Patch – Graphical User Interface for Brett Copeland's *curiouser*



Ableton Live

Arrangement View



Session View

Hardware

This section will discuss various pieces of hardware that is needed for most electro-acoustic performance. All prices were quoted from Sweetwater's online store. The prices listed here should only serve as a reference. It is possible that these prices have changed or the products can be found for lower prices elsewhere.

Microphones

In the case of electro-acoustic performance microphones are not only used for amplification purposes. If performing any piece that requires signal processing the performer will need a way to send the audio signal from the instrument to the processing unit. Depending on instrument and the user's audio interface the type of microphone needed varies.

Dynamic – these microphones are durable, relatively inexpensive, and resistant to feedback in a live performance setting. Dynamic microphones are ideal for electro-acoustic performance because of its frequency response, pickup patterns, and versatility.

Condenser – higher quality microphone generally used for recording. They can be used in performance but are more prone to creating feedback issues due to expanded frequency response capabilities.

Contact – these microphones clip on to the instrument and amplify the vibrations coming directly from the instrument. They are generally less expensive but typically result in a poorer audio quality.

Here are two popular examples of microphones that can be used in live performance.

Shure SM 57 (dynamic) – $99.99 – sweetwater.com

Korg CM–200BK Contact Microphone – $15 – sweetwater.com

Interfaces

The audio interface is a piece of hardware that brings signal into the performers computer. Interfaces can connect microphones, MIDI controllers, and a variety of other signal producing instruments to the user's computer. The interface also sends signal from the user's computer to a sound system.

Here are a few examples of audio interfaces that work well for solo electro-acoustic performance.

M-Audio M-Track Pro – $99.99 – m-audio.com

This interface is affordable, compact, and lightweight.

It includes:

- 24 bit / 48kHz digital audio processing
- 2 XLR (microphone) inputs
- 2 1/4" inputs
- MIDI in/out well as
- USB connection for your computer
- Headphone jack with independent volume control
- Phantom power capabilities

Focusrite Scarlett 2i2 – $130 – sweetwater.com

This interface is catered towards solo electro-acoustic performance.

Features include:

- 24-bit / 96kHz digital audio processing
- USB power and computer connection
- 2 in / 2 out
- Both XLR and 1/4" inputs
- 2 1/4" stereo outputs
- Phantom Power capabilities
- Direct monitor control on front panel

MIDI Devices and Controllers

MIDI is short for Musical Instrument Digital Interface and is used as a way to send information from an electronic musical instrument to a computer. In electro-acoustic performance MIDI controllers are used to trigger events in various programs.

MIDI controllers come in all shapes and sizes, from foot controllers to keyboards. It is common with electro-acoustic performance for the performer to not have any hands free because of the demands of playing their instruments. Using foot controllers solves this issue. Many performers use foot controllers to send MIDI information to their computers hands-free.

Here are some examples of MIDI foot controllers and where to purchase them.

IK Multimedia iRig Blueboard Bluetooth MIDI Pedalboard – $99.99 – sweetwater.com

This is a light and weight and durable pedal board that can communicate with your computer via Bluetooth and is battery operated. The board is completely wire/cable free unless you want to run 1/4'' cables from an instrument into it. The controller has four MIDI switches that you can use to send information to your computer.

Behringer MIDI Foot Controller FCB 1010 – $149.99 – sweetwater.com

The Behringer MIDI Controller has 10 buttons with 8 other banks available to be used. The board also has two expression pedals, which can send linear streams of MIDI information rather than just a single number. The board has MIDI in/out and needs to connect to an interface via MIDI cable. The board requires power.

Setup

Signal Flow

This is a visual representation of signal flow in electro-acoustic performance:

Instrument (or voice) signal → Microphone → Interface inputs → Computer Processing → Interface outputs → Sound System

Microphone

There are numerous ways to set up a microphone to use in performance. The most common way is to use a mic stand and place it where the best sound of the instrument comes from. Then, in order to connect the microphone to the interface and send the audio signal to the computer you will use either an XLR or a 1/4" cable. Most dynamic and condenser microphones use XLR cables and contact microphones use 1/4" cables.

Interface

Interfaces require a small amount of setup before they can communicate with your computer. The interface will come will a driver that needs to be installed on the computer's hard drive. Once the interface's driver has been installed on the computer it is ready for use.

There are different connections between interfaces and computers available and they vary based on the type of computer. The most common connection is USB 2.0 (for both MAC and PC). Another common connection used with interfaces is fire wire, though it is becoming less popular.

Once the interface is connected to the computer via USB 2.0, or fire wire, you are ready to open the software you will be performing with and connect your interface.

Software

In most programs sending and receiving signal from your interface is simply a matter of changing your Audio I/O preferences. For example: in MAX, to send and receive signal from your interface you need to find the “option” menu and click on the “Audio Status” tab. Once in the menu, find the input device dropdown menu and select your interface. As a default the program will select “Built-in Input”, and generally that is not what you will be using. The same process is used to set the computers output to the interface.

MIDI Controllers

Setup for MIDI controllers can vary drastically depending on the piece of gear. Typically, the device will need power and will connect to your interface via MIDI cable. MIDI cables are 5-pin connections and cost ~$15. Bluetooth connections are possible and are becoming more popular, replacing the MIDI cable.

Interface to Sound System

This stage of signal flow can vary depending on the specifications of the sound system you are using and what outputs your interface has. For this guide it is assumed that you will only have stereo 1/4" outputs available.

A recital hall or performance venue will usually have a mixing console with both XLR and 1/4” input capabilities. The mixing console controls and sends signal to the sound

system. Whether you are running into a wall plate, which is on stage and sends signal to a mixing console, or connecting directly to a mixing console, you will need to send a balanced signal. The most efficient way to achieve this is to send the stereo 1/4" outputs from your interface into a DI box. The DI box will then balance the signal from your interface and change the impedance to match the signal from an XLR input. From there, you can connect the DI box to a mixing console via two XLR cables.

Here is a breakdown of the signal flow:

Interface stereo 1/4'' outputs → DI box → Mixing Console via two XLRs → Sound System

Budget for a basic "rig"

This budget assumes that the performers has no software or equipment but already owns a laptop computer. These prices were all quoted from sweetwater.com, cycling74.com (MAX pricing), and ableton.com (Ableton pricing).

Hardware/Software	Specific piece of equipment or software	Price
Microphone	Shure SM 57	$100
Cables	20' Male-XLR to Female-XLR (mic to interface input)	$17
	15' Classic Waves Instrument Cable (interface output to DI)	$12
Interface	M-Audio M-Track Plus	$99
MIDI Foot Controller	IK Multimedia iRig Blueboard Bluetooth MIDI Pedal board	$100
Software	PureData	Free
	MAX/MSP	$10/month
	Ableton Live (intro)	$100
Total cost	Using PureData	**$328**
	With a monthly MAX lease ($10 x 12 months)	**$448**
	With a purchase of Ableton Live-Intro	**$428**

Recommended Works for Brass + Electronics

This list is by no means comprehensive, rather a suggested list of pieces for interested performers to pursue. Each piece has a brief description of the piece and the electronics required to perform.

Trumpet

Barbarophonos for trumpet and live electronics – Tychonas Michailidis (real-time electronics)

This piece uses various soundscapes and delay lines to create an ambient texture for the soloist to improvise in.

Technical Requirements: microphone, interface, laptop, Ableton Live, and stereo sound system.[2]

Extensions for trumpet and pre-recorded tape – David Cope (instrument + tape)

This piece requires the performer to record the tape part prior to the performance. The tape part consists of percussive sounds made with the trumpet, eight separate trumpet parts, and vocal noises. The piece challenges the performer to play with the "ensemble" in a rhythmically driving and "post-tonal" composition.

Technical Requirements: ability to pre-record the tape part and stereo sound system.[3]

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2. Barth, Michael. Repertoire for solo trumpet and electronics. 2009 (cited April 6 2016). Available from http://michaelbarth.ca/research-2/ (accessed April 6, 2016).

3 . Barth, Michael.

Ricecar una Melodia – Jonathon Harvey (real-time electronics)

This piece uses a series of delay lines to create a unique counterpoint system and sonic landscape. Originally, the piece was performed using two 4-track recorders but has since been adapted to be performed with MAX/MSP.

Technical Requirements: microphone, interface, laptop, MAX/MSP, and stereo sound system.[4]

Horn

Fathoms for horn and electronics – Steven Snowden (real-time electronics)

This is piece is performed using a MAX/MSP patch.

Technical Requirements: microphone, interface, laptop, MAX/MSP, and stereo sound system.[5]

Nisi for horn and live-electronics – Kevin Ernste (real-time electronics)

This piece was composed for hornist Adam Unsworth and dedicated to composer Iannis Xenakis for his 90th birthday. This piece is an event-based PureData patch that the performer can controller with a MIDI foot controller. The performer is instructed to do various gestures while playing.

Technical Requirements: microphone, interface, laptop, PureData, MIDI foot controller, and a stereo sound system.[6]

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4. Barth, Michael. Repertoire for solo trumpet and electronics. 2009 [cited April 6 2016]. Available from http://michaelbarth.ca/research-2/ (accessed April 6, 2016).

5 . Snowden, Steven. Works– Works–Horn and electronics. 2009

6 . Ernste, Kevin. Kevin Ernste, composer. 2012 (cited April 6 2016). Available from http://digital.music.cornell.edu/kevinernste/nisi/.

Trombone

Animus I – Jacob Druckman (instrument + tape)

This piece starts with solo (theatrical) trombone and is later joined by the tape imitating the trombone. Throughout the course of the piece the performer "fights" against the tape and is eventually taken over by the tape.

Technical Requirements: Stereo sound system

Ground Round – Steven Snowden (real-time electronics)

This piece aims to depict the thoughts of a cow during a livestock auction. There are a variety of audio processes that are triggered by the performer throughout the piece.

Technical Requirements: microphone, MIDI controller, interface, laptop, MAX/MSP, stereo sound system

Euphonium

Aboriginal Voices – Neal Corwell (instrument + tape)

This piece begins with a cadenza in the solo part of a backdrop of didgeridoo samples and recordings of the human voice. The piece then turns into a metered dance that involves a lot of interplay between he soloist and the tape.

Technical Requirements: Stereo sound system

Basic Research 1 for euphonium and tape – Tyler Kline (instrument + tape OR instrument + broken tape)

This piece was originally written to be performed as a karaoke piece but was later adapted to be a broken tape piece performed using MAX/MSP. The piece includes a variety of extend techniques, both a euphonium and tape cadenza, as well as rhythmically complex passages between the instrument and the tape.

Technical Requirements: Stereo sound system OR laptop, MAX/MSP, MIDI controller, and stereo sound system

Echanges – Vinko Globokar (real-time electronics)

This piece features heavy electronic processing on the acoustic sound of the instrument. The score gives indeterminate duration, pitch, and rhythms for the performer.

Technical Requirements: microphone, interface, laptop, MAX/MSP, stereo sound system

Tuba

Three for One – Scott Wyatt (instrument + tape OR instrument + broken tape)

This is one of the original works written for tuba and tape. The piece is challenging and requires the performer to blend their sound with the electronic sounds as well as pre-recorded tuba sounds included in the tape part. This piece was originally performed as a karaoke piece but has since been adapted as a broken tape piece. Both performance options are available. Technical Requirements: Stereo sound system OR laptop, MIDI controller, sound system.[7]

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7 . Morris, R. W., Lloyd Bone, and Eric Paull. 2007. Music for euphonium and electronic media. In Guide to the euphonium repertoire. 211. Bloomington, Indiana: Indiana University Press.

Cadence VI – Henri Lazarof (instrument + tape)

This piece is for tuba and tape. The tape part is made of four pre-recorded tuba parts. The score uses traditional notation, graphical notation, and proportional notation. This piece asks for the performer to play multi-phonics, use a mute, and explores the range of the instrument.

Technical Requirements: Stereo sound system[8]

Still – Jonathon Harvey (real-time electronics)

Still is a slow and evolving piece that created by the performer playing long tones into a reverberation system that builds a dense texture. The performer determines the pacing of the piece and has control over the electronics by using a MIDI controller to start, stop, and clear the reverberation unit within MAX/MSP.

Technical Requirements: microphone, interface, laptop, MAX/MSP, MIDI controller, stereo sound system

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8. Morris, R. W., Lloyd Bone, and Eric Paull. 2007. Music for euphonium and electronic media. In Guide to the euphonium repertoire. 211. Bloomington, Indiana: Indiana University Press.

Electro-acoustic Performers

This section provides examples of electro-acoustic performers and what they are using in performance.

Jesse Chavez

Instrument – Tuba

Computer – iPad

Software – Loopy HD

Microphone – Sony ECM-CS10

Interface – N/A

MIDI Controller – Behringer FCB 1010 MIDI Foot Controller (with Bluetooth transmitter)

Brett Copeland

Instrument – Tuba

Software – MAX/MSP, Ableton Live, and PureData

Computer – MacBook Pro

Microphone – Shure SM 57 and Yamaha Silent Brass Mute with built-in pickup

Interface – M-Audio M-Track Plus (2 in 2 out)

MIDI Controller – Behringer FCB 1010 MIDI Foot Controller

Nathan Corder

Instrument – guitar

Computer – MacBook Pro

Software – PureData and Logic X

Microphone – MXL 991

Interface – Lexicon Omega

MIDI controller – Axiom 49

Jeffrey Funderburk

Instrument – Tuba

Software – MAX/MSP & Ableton Live

Computer – Custom-built PC

Microphone – Piezo Microphones, Earthworks QTC 40, Shure SM 81, Shure SM 57, Audio Technica AT 4047/SV

Interface – Focusrite Scarlett 18i20, Tascam US-122

MIDI Controller – Line 6 M-13 Stompbox modeler with 2 expression Pedals, DigiTech Vocal 300 Multi-Effects Processor, DigiTech JamMan Loop pedal w/FS3X footswitch, Ableton PUSH, M-Audio Oxygen 25 Keyboard

Sean Hamilton

Instrument – Percussion: vibraphone and drum set

Computer – MacBook Pro

Software – Pure Data, Logic, QLab

Microphones – MXL (condenser), Shure SM57, Shure SM81

Interface – Scarlett 18i20

MIDI – iRig Blueboard Bluetooth MIDI Pedal

Jon Hansen

Instrument – Tuba

Software – Ableton Live

Computer – MacBook Pro

Microphone – Shure SM 57

Interface – Focusrite Scarlett 2i2

MIDI Controller – Homemade Arduino Hand controller

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