

Concerto Grosso  
for Large Ensemble and Electronics

by

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## ABSTRACT

CONCERTO GROSSO is a 15-minute three-movement piece composed for an 11-instrument ensemble and electronics which is performed by an additional performer. The aim of this piece is to express my interpretation of classical Egyptian and contemporary Western musical idioms through the methods of both live orchestration and electronic processing.

The relationship between the acoustic instruments and the electronics is meant to sound as if the electronic part is a live processing of each acoustic instrument in real time, but in reality the processing does not occur live, and has been prepared prior to the performance by a recording of each individual instrumental part which has been made in advance. These recordings are processed and prepared into cues which are then triggered by an individual performer on a synthesizer.

CONCERTO GROSSO explores the generation of new timbers, textures and tuning systems out of the acoustic material performed by the instruments through the use of electronic processing. Through the alteration of timbres, the instruments can be altered to sound similar to native Egyptian and other-worldly instruments. The alteration of textures results from the duplication of one instrument into a choir of that instrument, which can either be aligned vertically or offset by small durations to create a brief nebula of sound. Finally, non-western tuning systems such as the Arabic "Maqamat" are generated through the processing of pitch in order to create intervals such as neutral seconds, which are not in the common practice technique of the instruments of the ensemble.

## ACKNOWLEDGMENTS

I would like to acknowledge my committee members, from whom I have learned through the experience of private lessons, classes taken as well as by example. Dr. Alex Temple's insight into the world of electronic media, chamber music composition and poly-stylistic technique inspired me to explore the world of musical collage and juxtaposition of acoustic music with electronics, while Dr. Danwen Jiang's violin instruction helped me explore the links between composer and performer as well as provide a great deal of musical and professional mentorship. Finally I would like to acknowledge my committee chair, Dr. Gabriel Bolaños who, through his classes and private instruction, has taught me to repertoires that hitherto was outside of my scope as well as developing new techniques of analysis and observation, and finally it was through his class that I learned to proficiency of using computer software for the purpose of manipulating live acoustic sound to complete this composition.

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## INSTRUMENTATION

1 Flute  
1 Oboe  
1 Clarinet in A  
1 Bassoon

1 Horn

1 Percussion player  
(Snare drum, Bass drum, Temple blocks,  
Tambourine, Suspended cymbals)

MIDI Keyboard

2 Violins (I + II)  
1 Viola  
1 Violoncello  
1 Contrabass

CONCERTO GROSSO, completed in spring, 2021, is the fulfillment of the composition portion of my doctoral dissertation in music composition. The piece is scored for large chamber ensemble with percussion and pre-recorded electronics.

In a performance of the piece, the musicians of the ensemble play with recordings of their parts made individually, in which certain passages from each part are processed electronically and prepared into samples and played back as cues by a performer on a midi keyboard who is following the conductor and their own part. The electronic cues are delivered in such a way as to give the impression that each instrument is being processed live as it is playing, thus the idea of a Concerto Grosso, where each instrument is given it's share of soloistic prominence by exploiting through computer-assisted processing, the properties of its unique timbre.

The techniques of processing include: duplicating an instrument to create choirs of the instrument's voice, transposition of original pitch material into microtonal intervals to create multiple Arabic folkloric scales, the re-synthesis of an instrument's timbre by altering the amplitudes of its overtones, expanding the instrument beyond it's practical range and altering the perception of spatial origin of the sound being made in a 3-dimensional frame.

The final product of the musical language of CONCERTO GROSSO aims to create phantom tones and timbres of instruments and voices from other times and cultures, created entirely by the acoustic layer, upon which this electronically processed layer is juxtaposed by the cues on the MIDI keyboard.

DURATION: approximately fifteen minutes

## I. PRELUDE

Sustained notes, harmonies and textures are altered slowly in the first movement in order to explore the finer degrees of the changes and mutations of the acoustic instrument coming through its electronic counterpart.

The first movement introduces the entire ensemble in block orchestration, and block processing. The strings introduce the harmonic background and texture in the form of scales of different rhythms and intervals from within the same pitch collection, a D-flat major scale, while being electronically processed in a way that duplicates them and creates a string orchestra section out of 5 individual players, as the winds interject descending cascade gestures from a pitch collection (D-flat major pentatonic scale) closely related to that of the strings (and later contrastingly as a whole-tone scale) while being processed in a way that again duplicates the instruments and offsets each entry by a fraction of a second in order to create a deep ocean of sound out of a chamber group of 4 wind players. The horn, featured as a soloist in the opening, is processed individually by the alteration of its timbre through the re-synthesis of its overtones. As the sustained and full texture starts to decay and allow for gaps, more soloistic passages are played while being processed by rhythmically distorted mimicry and transposition to registers beyond their possible ranges.

## II. VIVACE

The second movement focuses on fast poly-rhythmic development where a violin's perpetual motion 16<sup>th</sup> note pulse in 4/4 is challenged by dotted eighth note pulses coming from the lower strings and high winds. This is the main point of tension in the movement, and is further indulged by the electronics compressing whole scales into a proportion of the original tempo of the previous scales. Grand tutties and fast arpeggiations of the natural string harmonics comprise the climax which leads to a rapid dissolving of the musical material by echoing and dove tailing the winds final upward gestures and giving the impression that they are physically moving away by altering their frame of reverberance. The movement ends nonchalantly on the same chord on which it began.

## III. ADAGIO

The final movement takes the most soloistic approach to electronic processing. The full dynamic ranges of the instruments and the potential for processing within this change in acoustic amplitude is explored from the onset of the movement. In the first half, each instrument, as it gets louder, sounds a series of "other" notes generated by natural ratios of it's frequency, that results in a 7-note Arabic maqam, of which most use the interval of the neutral second, (150 cents or a ratio of 11/12). Different maqams use the interval between different degrees within the mode, and some contain 2 neutral second steps while some are identical to the Western tempered scales such as natural major and harmonic minor. Seven of the most common maqams are used in this movement, and the electronics are used prominently to sound neutral seconds from instruments on which they are not practical to play, such as the winds. While the horn may perform neutral seconds as part of any series, the challenges of doing so within one mode are compensated through the electronic manipulation of its frequency. The second half of the movement comprises the use of Danish composer Per Nørgård's "infinity series", a simple equation that generates an infinite fractal pattern based on a single interval. In this movement, the variable of the interval is replaced with a scale degree from a pitch collection of maqam "Rast", which contains two neutral second intervals. Adjacent maqams which contain the same neutral second but between different scale degrees and starting from other notes, are slowly cascaded in the winds while the horn and bassoon leap between minor thirds within the corresponding maqams in the winds, while the electronics fill in the leap of the minor third with a neutral second, mimicking the sound of the horn and bassoon and therefore completing the steps of the maqam.

#### Performance notes:

- A performance of the piece will be prepared through a sequence of steps. Since the electronic part is designed to be perceived as a real time processing of the acoustic music, each electronic part has to sound unique to the instruments and musicians who will perform it. The first step is that, before the first rehearsal, each instrument will prepare recordings of their parts separately, which will be treated through electronic processing to be performed back with the orchestra as samples during a live concert. In order to synchronize alignment of tempi between recordings, an unchanging click track set to the tempo marking during the recording. These cues may be prepared by composer or anyone who wishes to do so may contact the composer to obtain the necessary MAX patches.
- The electronic setup includes a midi keyboard connected to a laptop or transportable desktop with the Max/MSP software and patch ready to go, which is connected to the speakers. 3-4 speakers arranged equal distance from each other in a semi-circle behind the orchestra is recommended for the optimal delivery of the electronic part.

#### Notation guide:

- Notation is to be interpreted conventionally unless otherwise instructed in writing on the score.
- For strings, the instruction “ord.” denotes a return to conventional arco after alternate arco techniques such as sul-ponticello (sul pont.), and the instruction “arco” denotes the same conventional bowing after pizzicato.
- The electronic part is shown on the score above the string section. The lower staff or staves show the key to be pressed on the midi keyboard, which will be in chromatically and in chronological order, and the staff above is a real-pitch realization/transcription of the cue triggered by the midi key in the staff below.

### *for Large Ensemble and Electronics*

Mohamed-Aly Farag  
(2021)

♩ = 48

♩ = 48

 $\equiv$ 

1

This image shows a page from a musical score, likely for a symphony. The score is written for a large ensemble, including woodwinds, strings, and percussion. The staves are arranged vertically, with the following instruments listed on the left: Fl. (Flute), Ob. (Oboe), Cl. (Clarinet), Bsn. (Bassoon), Hn. (Horn), Perc. (Percussion), Cs. (Cymbals), MIDI, Vln. I (Violin I), Vln. II (Violin II), Va. (Viola), Vc. (Violoncello), and Cb. (Double Bass). The score includes various musical notations, such as notes, rests, and dynamic markings like 'p' (piano) and 'mf' (mezzo-forte). There are also some specific markings like '12' and '10' above certain notes, and a 'WINDS con. 7-9' marking above the Percussion staff. The bottom of the page has a large, stylized graphic element that looks like a musical staff with a single note.



24

Ri. *ff*

Ob. *ff*

Cl. *f*

Bon. *f*

Hr. *leggero* *mf* *f*

Perc.

EX. *HORN* *PROCUJANNET*

MED.

Vln. I *mp* *mf* *molto vib.* *mf* *ff*

Vln. II *mp* *mf* *molto vib.* *mf* *ff*

Vla. *mp* *f*

Vcl. *il.* *p* *mf* *ff*

Cb. *mp* *f*

26

**B**

Ri. *p* *mp* *f* *ff*

Ob. *mp* *f* *ff*

Cl. *ff* *p* *f* *ff*

Bon. *p* *mf* *f* *ff*

Hr. *p* *f* *p* *f*

Perc. *Snare drum* *mp* *mf* *f* *Bass drum* *f*

EX. *CHORUS* *allegro*

MED.

**B**

Vln. I *il. sul pont.* *ord.* *p* *f* *sul pont.* *mf*

Vln. II *il. sul pont.* *ord.* *p* *f* *sul pont.* *mf*

Vla. *pizz.* *arco* *p* *f* *sul pont.* *mf*

Vcl. *pizz.* *arco* *f* *mf* *sul pont.* *mf*

Cb. *mf* *arco* *mf*

30

Ri. *p* *mf* *f*

Ob. *p* *mp* *f*

Cl. *p* *mp*

Bsn. *p* *mp* *pp* *mp* *espress.*

Hr. *mp* *f* *p* *mf* *p* *con sord.* *pp*

Perc. *Suspended cymbal* *p* *p* *mf*

EX. *BASSOON*

HDI

Vln. I *ord.* *f* *mf* *f* *mf*

Vln. II *ord.* *f* *mf* *f* *mf* *arco* *mp* *f*

Vla. *pizz.* *f* *p* *sul pont.* *pp*

Vcl. *pizz.* *f* *p* *III sul pont.*

Cb. *p*

34

[C]

Ri.

Ob.

Cl.

Bsn.

Hr.

Perc.

EX. *HORN chords* *FLUTE vrb.* *HORN Bu.*

HDI

[C]

Vln. I *con sord.* *pp*

Vln. II *con sord.* *pp*

Vla. *con sord.* *pp*

Vcl. *ord.* *mf* *pp* *IV* *III* *ord. I* *sul pont.*

Cb. *pp*



[illegible]

**Duration: 4:30**

**II. Vivace**  
♩ = 120

Flute  
Oboe  
Clarinet in A  
Bassoon  
Horn in F  
Percussion: Cymbals, Temple blocks  
ELECTRONIC REALIZATION: WINDS con. 5, (Pressure) dynamic sensitive  
MIDI  
Violin I  
Violin II  
Viola  
Violoncello  
Contrabasso

≡

9

Flute  
Oboe  
Clarinet in A  
Bassoon  
Horn in F  
Percussion: Snare drum  
ELECTRONIC REALIZATION  
MIDI  
Violin I  
Violin II  
Viola  
Violoncello  
Contrabasso

**F**

15

Fl. *p* *mf* *p* *f*

Ob. *p* *mf* *p* *f*

Cl. *p* *f*

Bsn. *p* *mf* *p* *f*

Hr. *pp* *f*

Perc. Triangle *f* Snare drum *pp* *f*

EX. *f*

MIDI *f*

Vln. *cruc.*

Vln. *cruc.*

Vla. *cruc.*

Vc. *cruc.*

Cb. *cruc.*

29

Fl. *f* *mf*

Ob. *f* *mf*

Cl. *f* *mf*

Bsn. *f* *mf*

Hr. *ff* *mf*

Perc. Cymbals *fp* Bass drum *f*

EX. *DOUBLE BASS*

MIDI *DOUBLE BASS*

Vln. *ff* *mp* *pizz.* *mf*

Vln. *ff* *mp* *pizz.* *mf*

Vla. *ff* *mp*

Vc. *ff* *mp* *pizz.* *mf*

Cb. *ff* *mp* *ad. pont.* *mf*

26

Fl. *mp* *p* *f*

Ob. *mp* *p* *f*

Cl. *mp* *p* *f*

Bsn. *mp* *p* *f*

Hr. *mp* *f* *p* *f*

Perc. Cymbals *f*

EX. *FLUTE GLASS*

MIDI

Vln. *arco sul pont.* *mp* *f* *and.* *f* *mp*

Vln. *arco sul pont.* *mp* *f* *and.* *f* *mp*

Vla. *f* *mp*

Vcl. *mp* *arco sul pont.* *mp*

Cb. *mp*

32

Fl. *f* *mp* *p*

Ob. *f* *mp* *p*

Cl. *f* *mp* *p*

Bsn. *f* *mp* *p*

Hr. *f* *mp* *p*

Perc. *Snare drum* *mp*

EX. *WOODEN CHIMES*

MIDI

Vln. *f* *p* *pizz.* *mp*

Vln. *f* *p* *pizz.* *mp*

Vla. *f* *p* *pizz.* *mp*

Vcl. *f* *p* *pizz.* *mp*

Cb. *f* *p* *pizz.* *mp*



47

Ri. *mf* *p* *mp* *mf*

Ob. *mf* *p* *mp* *mf*

Cl. *mf* *p* *mp* *mf*

Bsn. *mf* *p* *mp* *mf*

Hr. *mf* *p* *mp* *mf*

Perc.

EX. *WINDS mm. 49-52* *HORN mm. 53-55* *HORN mm. 56-57* *TRUMPET mm. 58-61*

MIDI

Vln. I *mf* *mp* *ord. espress. mf* *mf*

Vln. II *mf* *mp* *ord. espress. mf* *mf*

Vln. III *mf* *mp* *ord. espress. mf* *mf*

Vln. IV *mf* *mp* *ord. espress. mf* *mf*

Vc. *mf* *mp* *ord. espress. mf* *mf*

Cb. *mf* *mp* *ord. espress. mf* *mf*

*sul pont. II* *sul pont. III* *sul pont. IV* *sul pont. I* *sul pont. I*

58

Ri. *mf* *p* *mp* *mf*

Ob. *mf* *p* *mp* *mf*

Cl. *mf* *p* *mp* *mf*

Bsn. *mf* *p* *mp* *mf*

Hr. *mf* *p* *mp* *mf*

Perc.

EX. *STRINGS mm. 62-64*

MIDI

Vln. I *mf* *mp* *p* *mf*

Vln. II *mf* *mp* *p* *mf*

Vln. III *mf* *mp* *p* *mf*

Vln. IV *mf* *mp* *p* *mf*

Vc. *mf* *mp* *p* *mf*

Cb. *mf* *mp* *p* *mf*

*sul pont. III* *sul pont. III*

65

Ri. *mp*

Ob. *mp*

Cl. *mp*

Bsn. *mp*

Hr. *p* *mf* *p* *ritmo* *f*

Perc.

EX. *WHICH now 47-70*

MDI

Vln. *f*

Vln. *f*

Vla. *f*

Vcl. *f* *ord.*

Ch. *f* *ord.*

≡

71

Ri. *mf*

Ob. *f*

Cl. *f*

Bsn. *mf*

Hr. *ff*

Perc. *Bass drum* *Cymbals* *f marc.* *f marc.*

EX. *HORN Gtr.*

MDI

Vln. *pizz.* *f* *arco* *mf*

Vln. *pizz.* *f* *arco* *mf*

Vla. *pizz.* *f* *arco* *mf*

Vcl. *pizz.* *f* *arco* *mf*

Ch. *pizz.* *f* *arco sul pont. III, IV* *mf*





113

Ri. *ff*

Ob. *f*

Cl. *ff*

Bn. *ff*

Hr. *f*

Perc. *f* *Temple blocks*

Ex. *f*

MDI *f*

Vln. *ff* *marcato*

Vln. *ff* *marcato*

Vln. *ff* *marcato*

Vc. *ff* *marcato*

Cb. *ff* *marcato*



120

Ri. *ff*

Ob. *ff*

Cl. *ff*

Bn. *ff*

Hr. *ff* *marcato*

Perc. *ff*

Ex. *ff* *WINDSTRINGS Blend and scratch dynamically gradually*

MDI *ff*

Vln. *ff*

Vln. *ff*

Vln. *ff*

Vc. *ff*

Cb. *ff*

124

Fl.  
Ob.  
Cl.  
Bsn.  
Hr.  
Perc.  
Eup.  
Tbn.  
Vln. I  
Vln. II  
Vla.  
Vcl.  
Cb.

*Bass drum*  
*up*  
*molto cresc.*

127

Fl.  
Ob.  
Cl.  
Bsn.  
Hr.  
Perc.  
Eup.  
Tbn.  
Vln. I  
Vln. II  
Vla.  
Vcl.  
Cb.

132

P

Ri

Ob.

Cl.

Bsn.

Hr.

Perc.

EX

MIDI

Vln.

Vln. II

Vla.

Vcl.

Ch.

WINDS enter 133

WINDS enter 134

WINDS enter 135

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Ri

Ob.

Cl.

Bsn.

Hr.

Perc.

EX

MIDI

Vln.

Vln. II

Vla.

Vcl.

Ch.

WINDS enter 138

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III. Adagio  
♩ = 44

Flute  
Oboe  
Clarinet in A  
Bassoon  
Horn in F  
Percussion  
ELECTRONIC REALIZATION  
MIDI  
Violin I  
Violin II  
Viola  
Violoncello  
Contrabasso

9

Fl.  
Ob.  
Cl.  
Bn.  
Hr.  
Perc.  
WINDS - STRINGS  
MIDI  
Vln. I  
Vln. II  
Vla.  
Vcl.  
Cb.

17

Fl.  
Ob.  
Cl.  
Bsn.  
Hr.  
Perc.  
Eup.  
Melo.  
Vln. I  
Vln. II  
Vla.  
Vcl.  
Cb.

≡

24

R

Fl.  
Ob.  
Cl.  
Bsn.  
Hr.  
Perc.  
Eup.  
Melo.  
Vln. I  
Vln. II  
Vla.  
Vcl.  
Cb.



42 (NAHAWAND B-flat) (RAST B-flat)

Fl. Ob. Cl. Bsn. Hrn. Perc. E.K. M.D. Vln. Vla. Vc. Cb.

Snare drum *pp* poco cresc.

FL. OR. CL. HORN natural 2nd

STRINGS alternate randomly between sul tasto and sul ponticello while playing arco flautando.

46 (RAST B-flat)

Fl. Ob. Cl. Bsn. Hrn. Perc. E.K. M.D. Vln. Vla. Vc. Cb.

FL. OR. CL. HORN natural 2nd

STRINGS: molto flautando e poco sul ponticello

Duration: 4:30  
Total: 13:10