

# *Waves of Refraction*

for guitar and tape

by  
Jon Christopher Nelson

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*Waves of Refraction* (1992) for guitar and tape creates aural illusions which are analogous to the visual illusions of light waves refracted through water. Just as an object submerged in water appears slightly warped and unstable, the guitar refracted by the computer-generated tape sounds altered and mutable. At the beginning of the composition, the tape accurately replicates the guitar sounds. However, the tape quickly undergoes a metamorphosis, becoming more unusual and exploratory as the composition unfolds. The guitar also presents material that changes from nervous and disjunct figuration to more lyric lines. *Waves of Refraction* was commissioned by Carlos Molina, to whom the composition is dedicated. The computer-generated tape was produced in the Florida International University Electronic Music Studio.

## Notes for the performer:

Chromatic alterations apply throughout the measure.

The guitar part may be played with a certain amount of liberty. The fermatas and pauses are included to provide the performer with moments to wait for the tape cues (if waiting is necessary). In addition to the exceedingly fast finale and the percussive guitar punctuations throughout the score, there are five different musical styles juxtaposed in this work. These playing styles are marked with rehearsal markings A, B, C, D, and E. Although specific rhythms have been notated within the tempi provided in the score, it may be easier to simply have a rough idea of tempo for each of these styles. The music within the A sections should be fast and the rhythms should be played as accurately as possible. The B sections are slow, introspective sections which usually occur as cadences or cadential extensions. The most lyric sections are played at a moderato tempo and are designated by the rehearsal letter C. Music at any rehearsal letter D should be played as a *leggiero* arpeggiation at an *allegretto* tempo. Rehearsal letter E represents a cross between letters C and D in that it should be lyric and tuneful, yet arpeggiated and a little faster than C.

The notation for the tape portion only includes significant cues and entrances. The tape part has been omitted from the score in measures 156-238 and the performer is asked to simply play as fast as possible throughout this section. Upon completing this section, the performer is asked to continue playing in this wild and erratic fashion until the tape cue in m. 240. The performer may take some time getting used to the cues and should feel free to adjust their tempi in response to the cues.

A thick horizontal beam with two thin vertical beams on the right side indicates the moment when the tape part rests.

# Waves of Refraction

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Allegro ♩ = 120

Misterioso Repeat until tape cue for second measure.

guitar

tape

8 1

pp mf sfz f sfz pp sfz f

Tape starts about 5" after the guitar begins. 15"

pppp sfz p

5

f mp f sfz sffz sfz mf ff

slide fingers down string 6

ord. 3

8

mf sfz mp f sfz

slide fingers down string 6

10

sffz ff fff sfz ffff

△ ▽ simile

6

8

ppp sfz f

*a tempo*  
Molto Secco

*mp*

14

3

5:4

simile

etc. (the imitation continues, getting more dense and distorted)

*mp*

1-XII ord. l. v.

4-IX l. v.

3-VII l. v.

19

*mf*

*mp*

*mf*

*mp*

*mf*

*sfz*

full pizz.

*mp*

ord. l. v.

*ff*

*ff*

*sfz*

l. v.

24

*mf*

*p*

*sfz*

*p*

Cantabile

*pp*

*ff*

- 2 -

*a tempo*  
full pizz.

Cantabile  
ord.

4-VII l. v.  
2-IX l. v.

29 *f* *p* *mf* *mp* *mf* *ff* //

(imitation of m. 29 guitar part)

*fff* *mp* *ff* *mp*

34 *mp* *mf* *mp* *mf* *mf*

l. v. l. v.

38 *f* *mp* *mf* *f* *sfz* *f* *sfz*

l. v.

3-IX l. v. 2-IX l. v.  
4-VII 5-IX l. v. l. v.

38 *f* *mp* *mf* *f* *ff* *mf*

5:3

*f* *mp* *mf* *f* *sfz*

- 3 -

44

ord.

*p* *f* *mp*

2-XII  
3-XII

4-IX  
1. v.

//

sul tasto

5:4 5:4

*mf* *ff* *p*

Cantabile  
ord.

49

*pp* *f* *mf*

6-IV  
3-V

5-VII

2-IV  
1-VII

1. v.

*ppp* *p* *mf*

*a tempo*

(imitation continues)

54

sul tasto

*sfz* *mf* *p* *mf*

ord.

*pp* *pp* *sfz*

*Sva*

*mp*

*a tempo*  
sul tasto

58

ord.

*sfz*

*f*

*rit.*

*Andante* ♩ = 76

*Espressivo*

*mf*

*sfz*

62

*mf* *p*

*ff*

*mf*

*mp*

*mp*

*sfz*

Repeat first beat until the tape cue.

3 3 5:4 7:4 7:4

67

*sfz*

*mf*

*f*

*mp*

*sfz*

*ppp*

3 6 6 6

8va

- 5 -

70

Musical score for measures 70-73. The upper staff (treble clef) features a melodic line with triplets and dynamic markings: *mf*, *sfz*, *f*, *mp*, *mf*, and *mp*. The lower staff (treble clef, marked *(8va)*) provides harmonic support with dynamic markings: *mp*, *pp*, and *sfz*.

74

Musical score for measures 74-76. The upper staff (treble clef) includes first and second endings marked "l. v." and dynamic markings: *f*, *sfz*, *mp*, *f*, *p*, and *mf*. The lower staff (treble clef) has dynamic markings: *mp* and *mf*.

77

Musical score for measures 77-80. The upper staff (treble clef) has dynamic markings: *sfz*, *mp*, *f*, *mf*, and *f*. The lower staff (treble clef) has dynamic markings: *ff*, *pp*, and *mf*. The piece concludes with a final chord in the upper staff.

Moderato ♩ = 96

sul tasto

Musical score for measures 80-83. The upper staff (treble clef) contains a complex rhythmic pattern of eighth and sixteenth notes. The lower staff (bass clef) contains a simple accompaniment of eighth notes. Dynamics include *pp* and *mp*. A text annotation reads: "A harmonic change or note entrance occurs with each change in the guitar pattern."

Musical score for measures 84-87. The upper staff (treble clef) features a melodic line with various rhythmic values. The lower staff (bass clef) provides accompaniment. Dynamics include *mf*, *subito p*, and *sfz*. Measure 87 includes a fermata over a note.

Musical score for measures 88-91. The upper staff (treble clef) continues the melodic development. The lower staff (bass clef) includes a fermata in measure 88 and a final melodic phrase. Dynamics include *f*, *subito p*, *mf*, *f*, and *ff*.

93 *ff* *ord.* *a tempo sul pont.* *p*

97 *f* *p*

101 *f* *mf* *mp* *Andante ord.*  $\text{♩} = 76$

Repeat last beat until tape cue.

105

*mf* *mp* *p* *sfz*

*pp* *sfz*

110

sul tasto

ord.

*pp* *mf* *ff*

*ppp* *ff* *sfz mf*

116

*a tempo*

pizz.

ord.

*mp* *mf* *sfz* *sfz* *sfz*

*p* *mp* *fff*

*a tempo*  
Cantabile

122 *mp* *mf* *mp*

*sul pont. poco rit.* *a tempo ord.* *sul pont. poco rit.* *ord.*

127 *f* *mf* *mp* *mf* *f* *mf* *sfz*

*mp* *mf* *fff* *sfz*

*a tempo* *poco rit. sul pont.* *a tempo ord.*

132 *mf* *f* *mp* *f* *mf* *mp*

*p* *mf*

136

*poco rit.*  
*sul pont.*

*a tempo*

*ord.*

*3*

*mf* *f* *mp* *mf* *f* *f*

140

*poco rit.*

*a tempo*

*ord.*

*sul pont.*

*ord.*

*3*

*mf* *f* *mf* *f* *ff*

*mf* *mf*

144

*sfz* *mf* *ff* *mf* *mp* *p* *ff*

*rit.*

*a tempo*

*f* *pp* *sfz* *mf*

If Necessary, repeat this marcato chord until the tape cue.

*Allegro Vivace* ♩ = 144

148

slide fingers down string 6

Play as fast as possible from here to m. 240. Listen for tape cue and skip to m. 240 if necessary. Otherwise, improvise until the cue as outlined in m. 239.

*Nervoso e Strepitoso*

153

The tape simply continues with more fast and wild music to m. 240.

160

166

173

Musical staff 173: Treble clef, 8/8 time signature. The staff contains a series of chords and melodic lines. A dynamic marking of *mp* is placed below the first measure. A *sfz* marking is placed below a chord in the fifth measure.

180

Musical staff 180: Treble clef, 8/8 time signature. The staff contains a series of chords and melodic lines. A dynamic marking of *f* is placed below the first measure. A *sfz* marking is placed below a chord in the second measure. A *f* marking is placed below a chord in the fourth measure. A *mp* marking is placed below a chord in the sixth measure, and a *mf* marking is placed below a chord in the eighth measure.

187

Cantabile sul tasto

Musical staff 187: Treble clef, 8/8 time signature. The staff contains a series of chords and melodic lines. A dynamic marking of *p* is placed below the first measure. A *sfz* marking is placed below a chord in the second measure. A *f* marking is placed below a chord in the third measure. A *sfz* marking is placed below a chord in the fifth measure. A *mf* marking is placed below a chord in the seventh measure, and a *ff* marking is placed below a chord in the eighth measure. The instruction "Cantabile sul tasto" is written above the first measure. The marking "ord." is placed above a chord in the third measure.

194

Musical staff 194: Treble clef, 8/8 time signature. The staff contains a series of chords and melodic lines. A dynamic marking of *f* is placed below the first measure. A *ff* marking is placed below a chord in the third measure. A *ff* marking is placed below a chord in the seventh measure.

201

Musical staff 201: Treble clef, 8/8 time signature. The staff contains a series of chords and melodic lines. A dynamic marking of *sfz* is placed below the first measure. A *f* marking is placed below a chord in the second measure. A *mf* marking is placed below a chord in the third measure. A *f* marking is placed below a chord in the fourth measure. A *sfz* marking is placed below a chord in the fifth measure. A *ff* marking is placed below a chord in the sixth measure. A *f* marking is placed below a chord in the seventh measure. A *sfz* marking is placed below a chord in the eighth measure.

209 *sfz* *mf* *fff* *ff* *sfz* *mf*

216 *ff* *mf* *sfz* *sfz* *f* *fff* *mf*

222 *f* *fff* *sfz* *ff* *mf*

229 *ff* *sfz* *ff* *f* *mf* *fff*

234 *ff* *f* *fff* *sfz* *ff* *fff* *sfz*

15"

Improvise in a similar fashion, getting louder, faster, and more percussive. Respond to the electronic tape.

239

*fff*

*mp*

10"

*fffz*

*ffff*

The tape contains similar sounds.

ord.

242

*fff*

*mf*

*ff*

*fff*

*fffz*

5:4

*fff*

*fffz*

*fffz*

3