

# The Chorus Digitalis Ensemble

 Version française

The Chorus Digitalis website moved to <http://cantordigitalis.limsi.fr>

/\* BEGINING OF THE COMMENTARY

```
<iframe width="420" height="315" src="//www.youtube.com/embed/_LTjM3Lihis"
frameborder="0" allowfullscreen></iframe>
```

## Presentation

*Chorus digitalis* is the first choir in the world composed of synthetic voices controlled in real time by graphic tablet. The synthetic voice instrument is called **Cantor Digitalis**/ */\* REMOVE THIS LINE TO UNCOMMENT \*/*. Resulting from research on the gestural control of voice synthesis initiated in 2005 by [Christophe d'Alessandro](#), Chorus digitalis has publically performed for the first time in March 2011 in Vancouver with its designers, Sylvain Le Beux, [Boris Doval](#), [Lionel Feugère](#) and [Christophe d'Alessandro](#). The current project is led by [Lionel Feugère](#) and [Olivier Perrotin](#). Controlling a voice using hand gestures is surprisingly easy: it is an intuitive control, which takes advantage of the skill acquired by writing. Learning is rather fast compared to that of other musical instruments. Chironomy, i.e. connecting hand, gesture and music, is our beautiful research topic. Synthetic voice is computed from a source-filter model, which reproduces the operation of the vocal apparatus. The source simulates changes in air flow at the glottis, and the filter simulates the filtering effect of the vocal tract. The parameters of this model are controlled by a stylus on a graphics tablet, the pressure and position in the two spatial dimensions can define the strength of voice, pitch and vocalic color. The synthesizer produces sung vowels, carefully setted to make traditional voice types: baritone, tenor, alto, soprano. Unusual voice types are also available, playing on the glottal source. Voice synthesis as realistic as possible, but which can get ridd off its model, here is a theme of research already old, but still new. Virtual voice lends itself to all kinds of music games, written or improvised, from the accompagning chorus to complex polyphony, through the solo voice singing in the style of North India, baroque Opera or contemporary music. The ensemble was started with the European project (FEDER) [Orjo](#) and is now funded by the ANR project [ChaNTeR](#). It is part of the research of the LIMSI's [Analyse & Synthèse Audio](#) sub-team and transversal research axis [VIDA](#). **To watch a video demonstration of the Chorus Digitalis performance:** - A contemporain choir 

```
<html> <iframe width="560" height="315" src="//www.youtube.com/embed/9-9_YCJRe-4" frameborder="0" allowfullscreen></iframe> </html>
```

- A North Indian raga

```
<iframe width="560" height="315" src="//www.youtube.com/embed/wIyZq03Jg8U"
frameborder="0" allowfullscreen></iframe>
```

## List of live performances and related audio/video files

## Soon

### 1. Thursday, 19th of June 2014, 7pm to 8pm, **Futur en Seine**

- Venue: *PROTO204, 200 rue André Ampère, Bures-sur-Yvette (91), France*
- Programm: *pieces from khayal repertoire, Purcell, Bach, Bulgarian repertoire, Bobby Mac Ferrin, Philip Glass, Les Grandes Gueules ... and a special [guest](#)*
- Full programm of the day: 12am to 8pm  
<http://www.futur-en-seine.fr/fens2014/projet/made-with-artists-rd-block-party/>

## Previous

### 1. 13th october 2013, **Fête de la Science Rhône-Alpes**

- Venue: [Village des Sciences](#), Privas (07), France
- Program :
  - *Raga Yaman - Teental* - Cantor Digitalis Solo, tablas

### 2. 5th-10th october 2013, **CURIOSITas festival**

- Venue: [Campus Paris-Saclay](#), Orsay, France
- Program:
  - *Raga Yaman - Teental* - Cantor Digitalis Solo, tablas, 3 cantor-tampura, 1 clavichord ([Video here](#))
  - *Lil Darlin' (Neil Hefti)* - 6 Cantor Digitalis & 1 snare drum
  - *Les Profondeurs (Boris Doval)* - 6 Cantor Digitalis
  - *Cantate 2.0 (Bach, Purcell, Chorus Digitalis)*, 4 Cantors Digitalis & Digitartic ([video ici](#))
  - *Valse (Bruno Lecossois)*, 6 Cantor Digitalis

### 3. Thursday 5th of September 2013, **JDEV2013**

- Venue: [Ecole Polytechnique](#), Amphithéâtre Aragon, Palaiseau (91), France
- Program :
  - *Raga Yaman - Teental* - Cantor Solo, tablas, 2 cantor-tampura
  - *Cantate 2.0*, 4 cantors digitalis & digitartic choir ([Video here](#))

### 4. Wednesday 29th of May 2013, **NIME Conference**

- Venue : [NIME'13](#), KAIST Auditorium, Daejeon, Korea Republic
- Program : *a piece from Chorus Digitalis (4 Cantor Digitalis / Digitartic) and VoxTatum (1 Handsketch), including the Cold Genius (Purcell) and Choral Wie Schön leuchtet der Morgenstern (Johan-Sebastian Bach)*

### 5. Saturday 13th of October 2012, **Journée Science & Musique**

- Venue: [Journée Science & Musique](#), Diapason, campus Universitaire de Beaulieu, Rennes
- Program: *Raga Miyan Ki Malhar* (North Indian classical music) - Cantor digitalis solo, tablas ([sound here](#))

### 6. Friday 22nd of June, 2012, **Music day festival**

- Venue: *Equipe [Lutherie Acoustique Musique \(LAM\)](#), Institut Jean Le Rond d'Alembert, Paris*
- Program: *Raga Miyan Ki Malhar* (North Indian classical music) - Cantor digitalis solo, tablas

### 7. Thursday 25th of May, 2012, 19h-20h, **Printemps de la culture**

- Venue: [Journées Arts Sciences, Printemps de la culture](#), Université Paris Sud, Orsay
- Program:
  - *Etoile Polaire* (Philip Glass, minimaliste), Chœur 6 cantors digitalis et clavecin
  - *Alta Trinita Beata* (Anonyme, médiéval) - Chœur 4 cantors digitalis et clavecin
  - *Sarabande de la suite en ré mineur, et Air "Lascia ch'io pianga", extrait de « Rinaldo »* (George Frideric Händel, baroque) - cantor digitalis solo et clavecin
  - *Raga Miyan Ki Malhar* (musique classique d'Inde du Nord) - Cantor digitalis solo,

tablas et chœur de tablettes ([vidéo ici](#))

- Valse (Bruno Lecossois, chorale contemporaine) - Chœur 5 cantors digitalis ([vidéo ici](#))
- Ocean (Bjork & Dirty Projector, expérimental) - Chœur 4 cantors digitalis
- Choral *Wie Schön leuchtet der Morgenstern* (Johan-Sebastian Bach, baroque) - Chœur 4 cantors digitalis
- *Canticum novum* (chorus digitalis, fusion) - Chœur 4 cantors digitalis, cantor digitalis solo, tablas, guitare et guitare basse

## 8. 14th of March, 2011, International Workshop on Performative Speech and Singing Synthesis

- Venue: *First International Workshop on Performative Speech and Singing Synthesis, University of British Columbia, Vancouver, Canada*
- Program:
  - Improvisation - chœur 4 cantors digitalis
  - *Alta Trinita Beata* (Anonyme, médiéval) - Chœur 4 cantors digitalis - ([court extrait vidéo ici](#))
  - Choral *Wie Schön leuchtet der Morgenstern* (Johan-Sebastian Bach, baroque) - Chœur 4 cantors digitalis



## Communications related to Chorus Digitalis

### 1. Journals

- C. d'Alessandro, L. Feugère, S. Le Beux, O. Perrotin, A. Rilliard, «Drawing melodies: evaluation of chironomic singing synthesis, » J. Acoust. Soc. Am. 135 (6), 3601-3612 (2014)
- C. d'Alessandro, A. Rilliard, and S. Le Beux "Chironomic stylization of intonation" J. Acoust. Soc. Am., 129(3), march 2011, 1594-1604.

### 2. International conferences with proceedings

- O. Perrotin, C. d'Alessandro, « Visualizing Gestures in the Control of a Digital Musical

Instrument », 14th International Conference on New Interfaces for Musical Expression (NIME 2014)

- L. Feugère, C. d'Alessandro, « Digitartic: bi-manual gestural control of articulation in performative singing synthesis, » 13th International Conference on New Interfaces for Musical Expression (NIME 2013), Daejeon, Korea, 27/05 au 30/05, 2013, 331-336.
- Perrotin, O., d'Alessandro, C., « Adaptive mapping for improved pitch accuracy on touch user interfaces. », 13th International Conference on New Interfaces for Musical Expression (NIME 2013), Daejeon, Korea, 27/05 au 30/05, 2013, 186-189.
- Lionel Feugère, Christophe d'Alessandro, and Boris Doval, «Performative Voice Synthesis for Edutainment in Acoustic Phonetics and Singing: A Case Study Using the "Cantor Digitalis », M. Mancas et al. (Eds.): », 5th International Conference on Intelligent Technologies for Interactive Entertainment, INTETAIN 2013, LNICST 124, pp. 169-178, 2013.
- S. Le Beux, L. Feugère, C. d'Alessandro, Chorus digitalis : experiment in chironomic choir singing, 12th Annual Conference of the International Speech Communication Association (INTERSPEECH 2011), Firenze, Italy, 27/08 au 31/08, 2011, 2005-2008. Paru dans Proceedings of the conference ISSN: 1990-9772
- L. Feugère, S. Le Beux, C. d'Alessandro, Chorus digitalis : polyphonic gestural singing, 1st International Workshop on Performative Speech and Singing Synthesis (P3S 2011), Vancouver (Canada), 14/03 au 15/03, 2011, 4p

### 3. Conferences with proceedings in french

- L. Feugère, C. d'Alessandro, Digitartic : synthèse gestuelle de syllabes chantées, Journées d'Informatique Musicale (JIM 2012), Mons, Belgique, 09/05 au 11/05, 2012, 219-225
- S. De Laubier, G. Bertrand, H. Genevois, V. Goudard, B. Doval, L. Feugère, S. Le Beux, C. d'Alessandro, Orjo et la Méta-Mallette 4.0, Journées d'Informatique Musicale (JIM 2012), Mons, Belgique, 09/05 au 11/05, 2012, 227-232

### 4. Conferences without proceeding

- L. Feugère, Contrôle gestuel d'occlusives pour les instruments de synthèse vocale. Journées Jeunes Chercheurs en Acoustique Audition et Signal Audio (JJCAAS), 17-19 novembre 2010, Paris.
- L. Feugère, Modèles de contrôle instrumental de la synthèse vocale . Journées Jeunes Chercheurs en Acoustique Audition et Signal Audio (JJCAAS), 7, 8 et 9 décembre 2011, Orange Labs, Rennes.

### 5. Invited conferences

- C. d'Alessandro « Computerized Chironomy : Five Years of Gesture-Controlled Voice and Speech Synthesis at LIMSI », 1st International Workshop on Performative Speech and Singing Synthesis (p3s), Vancouver, 14-15 mars 2011.
- L. Feugère et B. Doval, Contrôle par le geste d'une voix chantée de synthèse. Comment faire vivre une voix de synthèse ? De la fabrication d'un instrument de synthèse de voix chantée à sa pratique en concert, à travers un dialogue (dé)concertant entre un facteur de voix et d'un joueur de tablette. Illustration par l'interprétation d'un raga indien, en duo tablas-tablette. Journée Science et Musique 2012, Diapason, campus Universitaire de Beaulieu, Rennes, 13 octobre 2012.



## Media

- **Media Paris Saclay** 25th June 2014  
<http://www.media-paris-saclay.fr/retour-sur-making-with-trois-questions-a-ronan-james/>
- **France Inter** 16th June 2014  
Text : <http://www.franceinter.fr/emission-latac-musique-sur-mars-ocean-exploit>  
Audio (at 1'35) : <http://www.franceinter.fr/player/reecouter?play=920156>
- **INS2I/CNRS** 12th June 2014  
<http://www.cnrs.fr/ins2i/spip.php?article769>

## Participants

### Now (alphabetic order)

- Annelies Braffort : Cantor Digitalis (2013-)
- [Boris Doval](#): Research, Cantor Digitalis, clavichord (2010-)
- [Christophe d'Alessandro](#): Research, Cantor Digitalis, clavichord (2010-)
- Hélène Maynard : Cantor Digitalis, clavichord (2012-)
- [Lionel Feugère](#): Research, Cantor Digitalis, tablas, Chorus Digitalis co-coordinator (2010-)
- [Olivier Perrotin](#) : Research, Cantor Digitalis, Chorus Digitalis co-coordinator (2012-)
- Samuel Delalez: Cantor Digitalis (2014-)
- Simon Jacquin: Cantor Digitalis (2014-)



## Former members (alphabetic order)

- Emmanuelle Frenoux : Cantor Digitalis (2012)
- Marc Evrard : Cantor Digitalis, basse électrique (2012)
- Maxime Delorme : Cantor Digitalis, guitare électrique (2012)
- Sylvain Le Beux : Recherche, Cantor Digitalis (2010-2011)



## Other bands of synthetic singing voices outside LIMSI-CNRS

- *The Virtual/Augmented Chorale (VACHorale)*, with the [SqueezeVox](#) instrument (video [here](#))
- *Tutti Quanti Computing Orchestra* in the piece *D'ici et d'ailleurs*, with [The Voicer](#) instrument (video [here](#) and [here](#))
- *DIVA*, derived from the speech instrument called [Glove-TalkII](#) (video [here](#))
- *VoxTactum*, with the [ChoirMob](#) instrument (video [here](#)) or with the [HandSketch](#) instrument (video [here](#))
- and just for pleasure, even if no voice instrument is used as not synthesized in real time : the [Vocal Tract Lab](#) (video [here](#))

END OF THE COMMENTARY \*/

From:

<https://groupeaa.lisn.upsaclay.fr/> - **Groupe Audio Acoustique**

Permanent link:

[https://groupeaa.lisn.upsaclay.fr/en:projets:orjo:chorus\\_digitalis](https://groupeaa.lisn.upsaclay.fr/en:projets:orjo:chorus_digitalis)

Last update: **2015/01/21 11:37**

