Welcome to the
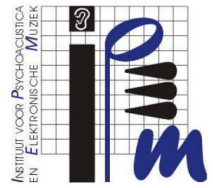
Symposium on Audio Research and Practice in Belgium

May 14th, 2019

Schedule

13:30–14:00 Welcome Address (Blauwe Vogel)

Federica Bressan
General Chair
Brecht De Man
Chair of the Audio Engineering Society Belgium Section
Prof. Marc Leman
Head of IPEM

14:00–15:00 Session 1 – Oral presentations 1 (Blauwe Vogel)
Chair: Gert Van Hoof

14:00   The Library of Voices: an interdisciplinary research venue in Leuven
         Toon van Waterschoot (KU Leuven)
14:20   Introducing the STrOOM-research
         *Frank Duchêne (PXL University of Applied Sciences and Arts / AES
         Belgium / frankduchene.com)*
14:40   Plus-Minus: A demonstrative acoustic audio art project
         Godfried-Willem Raes (Logos Foundation)

15:00–15:30 Coffee break & Networking (Blauwe Vogel)

15:30–16:30 Oral presentations 2 (Blauwe Vogel)
Chair: Toon van Waterschoot

15:30   VIAA: A national approach to safeguarding audio collections in Flanders
         Brecht Declercq (VIAA / FIAT/IFTA)
15:50   IP: A (r)evolution in broadcast
         Dirk Sykora (Lawo)
16:10   The importance of precise reproduction of time-domain information in
         loudspeaker Systems
         Kommer Kleijn (RITCS/INSAS)

16:30–17:00 Coffee break & demos

Co-Creation Space

Respiro: Physical modelling wind-synth with an organic response
Rudy Verpaele & Andrew Claes (Imoxplus BVBA)

Maker's Space

From Kindergarten to Radison
Philippe Druez (Ghent University / KASK)

Pluriversum

Axoloti: Standalone hardware for digital audio algorithms
Johannes Taelman (axoloti.com)

17:00–18:00 Oral presentations 3A (ASIL)
Chair: Frank Duchêne

17:00   Introduction to the ASIL lab
          Bart Moens (IPEM, Ghent University)

17:20   Auralization as a tool to bring auditory context in a dry lab environment
          Jorg De Winne (IPEM / WAVES-acoustics, Ghent University)

17:40   Luctor et immergo: Real-life implications of immersive realities for the engineer
          Steven Maes (PXL University of Applied Sciences and Arts)

17:00–18:00 Oral presentations 3B (Papegaai)
Chair: TBA

17:00   Use of simulation for loudspeaker installation effect prediction: Detailed evaluation on a car door model
          Arnaud de Potter (MSC Software (Free Field Technologies))

17:20   A new way of defining asymmetric shelving filter shapes
          Ahmad Al Zubaidi (iLaB - The Innovators Lab Belgium)

17:40   The iLaB Golden Ears Training Tool: Science-driven and engaging listening skills training application
          Aymeric Devergie (iLaB - The Innovators Lab Belgium)

18:00–18:30 Coffee break

18:30–19:30 Live coding music by Dago Sondervan (ASIL)

List of abstracts

The Library of Voices: an interdisciplinary research venue in Leuven

Toon van Waterschoot

KU Leuven

The KU Leuven audio engineering research group has recently opened The Library of Voices, a research venue comprising two new spatial audio reproduction labs at the historic Park Abbey site in Leuven. In partnership with the Alamire Foundation and the KU Leuven early music research group, we will be exploiting these labs to establish a new research program on the frontier of archaeoacoustics, spatial audio signal processing, interactive virtual acoustics, and early music performance. The main purpose of the lab will be to create an interactive and historically accurate auralization of church acoustics, in order to support performers and musicologists in their investigation of the impact of acoustics on the performance of plainchant and polyphony. In this presentation, we will give an overview of the lab facilities, present preliminary results of the first early music performance experiments that have taken place, and shed a light on upcoming research initiatives and long-term objectives.

Introducing the STrOOM-research

Frank Duchêne

PXL University of Applied Sciences and Arts / AES Belgium / frankduchene.com

Over the last three years PXL-Music and PXL-Education have been researching whether music software used by professionals can be the basis for schools to teach children concepts of music as well as audio technologies. This research centres around two software types: a tactile surface-based approach and the free Sonic Pi coding program. Frank DuchÃªne, one of the lead researchers and current vice-chairman of AES Belgium, will showcase the value of combining imagination with STEM-education.

Plus-Minus: A demonstrative acoustic audio art project

Godfried-Willem Raes

Logos Foundation

After having built some 76 musical robots, all acoustic in their sound generation but extensively controlled through both digital and analog electronics, the latest project we realized is very different in nature. 'Plus-Minus' is an audio art installation allowing participants to explore the world of sum- and difference tones in a truly interactive way. The project consists of 18 analog ring-modulators (multiplier circuits) combined with 38 signal compressors. The output is through three large megaphone speakers. The input – and that's where the project really gets to become interactive – is a very large set of precisely tuned thick aluminum tubes, to be freely selected in pairs by the participants. Different

sets of tubes are available: tuned to equal temperament as well as to 'platonic' just intonation. The installation physically takes the shape of a triangle, each side seating six tube-pairs. The author will comment on the design, the technical difficulties encountered relative to acoustics as well as on the philosophy behind this and similar audio art installations. Audio examples as well as some video snippets will be part of the presentation. Details on the project are available at: http://www.logosfoundation.org/projects/plus-minus/plus-minus.html

VIAA: A national approach to safeguarding audio collections in Flanders

Brecht Declercq
VIAA / FIAT/IFTA

VIAA, the Flemish Institute for Archiving, was founded in 2012 with the mission to digitise, sustainably archive and give access to the Flemish audiovisual heritage kept by broadcasters, libraries, archives, museums, government bodies and performing arts institutions. As such, it has become the main actor in the Flemish audiovisual heritage landscape, working for more than 150 organisations. When it comes to the digitisation, the mission is to transfer more than 650.000 carriers before 2023, including also more than 300.000 audio carriers. Today, VIAA is halfway through this task, but it is also internationally considered as a good example of a nationally coordinated approach to efficient and effective digitization and archiving of audiovisual heritage. In this presentation Brecht Declercq (Digitisation and Acquisition Manager at VIAA) will give a quick overview of the digitisation and transfer projects for audio carriers that VIAA has done or is still carrying out, including a few technical and organisational particularities of special interest to everyone interested in large scale radio and other kinds of sound archives.

IP: A (r)evolution in broadcast

Dirk Sykora
Lawo

In the last few years, a technical evolution took place in the broadcast industry. IP technology made it possible to produce live content using a complete new workflow. As a result, we see more and more companies running sport events or live shows from a centralized production environment. Remote production is a fact! What is remote production? What are the pros and cons for the audio technician? During this short seminar, we will highlight the evolution on a technical and operational level in live broadcast.

The importance of precise reproduction of time-domain information in loudspeaker Systems

Kommer Kleijn
RITCS/INSAS

Sounds and music contain information both in the time domain and in the frequency domain. Traditional loudspeakers seem to concentrate mainly on performance in the frequency domain and often the precise reproduction of time domain information, also known as aperiodic sound or transients, gets less attention. A first consequence of this is that percussive musical sounds and sonic events like objects hitting or falling are not reproduced very realistically. But more important is that the way the human auditive system perceives space, is based largely on time-domain information.
As a result, the general lack of precision in reproduction of time information in loudspeakers has consequences well

beyond the realism of percussive sounds and extends into other areas like for example the wide acceptance of inadequate compression algorithms, the proliferation of channels in immersive reproduction systems, and possibly the otherwise unexplained popularity of spaced microphone recording techniques.

The author is part of a team led by John Watkinson that develops new types of loudspeaker systems, based on study of human hearing, and with attention for precise reproduction and appropriate dispersion for both time information and frequency information. Prototype loudspeakers will be demonstrated briefly.

Introduction to the ASIL lab

Bart Moens
IPEM, Ghent University

The Art-Science-Interaction Lab (ASIL) allows research on new forms of musical interaction, production and experience, based on emerging technologies. The space is shared between IPEM and IDLab and MICT and aims to be at the forefront of creative-artistic and cultural innovations. During this talk the lab will be introduced with a focus on the technical infrastructure which combines a MoCap system, a digital audio network, and a wavefield synthesis speaker setup. The solutions to capture synchronized multi-modal research datasets during experiments will be discussed briefly as well.

Auralization as a tool to bring auditory context in a dry lab environment

Jorg De Winne
IPEM / WAVES-acoustics, Ghent University

Behavioral experiments aim to investigate how participants interact with each other or with their environment. Researchers design their experiments to come as close as possible to a real world scenario, not wanting to introduce artificial or uncomfortable situations. However, typical laboratories are 'dry' environments and far from feeling natural. This for sure has an influence on the participants, making it difficult to apply the results in real-world scenarios. Moving the lab to the real world is one way to cope with this, bringing context to the lab is another one. Context can be visual, like projection systems or VR, but also auditory. Although 99.9% of people know visualization, probably not even 10% know its auditory counterpart auralization. The very recent technique allows to create different acoustical settings (e.g. a church, a concert hall, an ancient temple, ...) and allows to simulate them 'as if you are there'. Our group's 62-speakers interaction lab, equipped with a motion-capture system, additionally allows to move yourself in these created settings. It needs no explanation that this comes closer to a real world setting than ever before, and then we're not even considering the combination with visualization techniques.

Luctor et immergo: Real-life implications of immersive realities for the engineer

Steven Maes
PXL University of Applied Sciences and Arts

There have been several revolutions in making music. From mono to stereo over surround to 3D sound. Each time these revolutions started from technological novelties and the artists followed later. New technologies allowed them to innovate their art. Ludwig van Beethoven for example composed innovative music when he received an Erard and later a Broadwood piano. The technology for making music in 3D is present but the artists and composers have not

yet made the switch. That's why there is a huge unexplored creative space where experimentation and innovation can lead to new types of music. With PXL-Music research we want to investigate this creative and technological process, the effects on art in general and on pop and rock music in particular. During his talk Steven Maes will use a case-study to demonstrate the possibilities when you compose a pop song from scratch tailor made for 3D audio. You will be able to listen to the end result on an object-based multichannel sound system, but also on headphones in binaural.

Use of simulation for loudspeaker installation effect prediction: Detailed evaluation on a car door model

Arnaud de Potter
MSC Software (Free Field Technologies)

To improve acoustic comfort and optimize acoustic trim components at early stages of the design process, the automotive industry extensively uses finite element models to predict car structure dynamic stiffness, and structure-borne and air-borne transfer functions. These models improve the NVH performances of new products, but also allow to accurately integrate the audio system in the car interior, helping car manufacturers to meet the increasing expectations of customers for acoustic comfort and the new demands for the car audio system (active noise control, artificial sound, and hands-free communication).

This presentation aims at demonstrating how a loudspeaker can be integrated in a car door finite element model. The vibro-acoustic simulation allows predicting the influence of the car interior environment on the audio system behavior. The sound quality inside of the car can therefore be improved in the early design phase, before prototypes are built and tested.

In a first step, the modeling approaches of the loudspeaker are described. In a second step the loudspeaker model is installed in a car door. The interaction of the loudspeaker with the car door structure and cavity is studied and the acoustic radiation to the inside of the car is computed.

A new way of defining asymmetric shelving filter shapes

Ahmad Al Zubaidi
MSC Software (Free Field Technologies)

Second order recursive filters have widespread usage in equalisation for audio production and electro-acoustic system tuning. They are commonly parametric filters with parameters which give intuitive control over the filter shape.

Traditional second order filter shapes typically use three independent parameters to control the filter shape. Though, in most cases this is sufficient, asymmetric shelving filters with four independent control parameters exist which can allow even greater flexibility in designing and controlling filter shapes. This can also have the added benefit of reducing the number of required filter sections to achieve a target response.

Although asymmetric shelving filters are already well known in loudspeaker design applications, controlling the exact shape of the filter using the existing methodologies can be unintuitive and difficult to predict with certainty without extensive experience in designing these class of filters.

To overcome this, at iLaB, we have developed an alternative definition used for specifying the filter shape for asymmetric shelving filters which is more closely related to the traditional filter shape definitions which are well known in the audio industry.

The iLaB Golden Ears Training Tool: Science-driven and engaging listening skills training application

Aymeric Devergie
iLaB - The Innovators Lab Belgium

Training critical listening skills and speaking a common language to describe sound among the audio engineering community or, at a smaller scale, within a company, is a fundamental factor in facilitating collaboration between its members.

Many software tools to train critical listening skills already exist. Some only scratch the surface and are intended for any person interested in audio. Other apps focus on one dimension of sound (for example frequency bands) and are intended for audio engineers or specialists.

Combining iLaB's long history in psychoacoustics research and the recent recommendation ITU-R BS.2399-0 (03/2017) describing methods for selecting and describing attributes and terms in the preparation of subjective tests, we have designed a challenging and fun tool that relies on the science of hearing. The purpose of the tool is twofold: 1. train our sound and acoustic engineers in critical listening and evaluation. 2. Teach a common language to facilitate communication and evaluation of sound systems or any subject that relates to subjective listening evaluation.

In this presentation, we will expose the philosophy behind the tool and highlight the engaging and fun part of it.

Respiro: Physical modelling wind-synth with an organic response

Rudy Verpaele & Andrew Claes
Imoxplus BVBA

Yamaha introduced the VL technology in the 90s, based on the Stanford University research. It has not been surpassed in terms of expression and concept. Although a growing number of musicians use expressive controllers, there is still a serious lack of physical modelling (PM) soft-synths specially designed for responding to breath pressure and continuous expression.

Imoxplus specialises in this domain and has a large customer base allowing deep insight in the niche market of musical Wind & Breath controllers. Its first product, Respiro, was pre-released in April and successfully used during Hans Zimmer concerts.

The design of a physical modelling synth for breath control presents a unique set of challenges. The most important one is to give the model an organic and distinctive character while keeping it very responsive, user and CPU friendly. Respiro will further evolve. Additionally Imoxplus is finalising the prototyping of an innovative mouthpiece (patent pending) that captures many musical expressions of the mouth. Other upcoming projects are the design of hybrid fingering units.

Physical Modelling synths demand a kind of alchemist approach. The right formula results in "Gold", one wrong ingredient results in "Bang".

From Kindergarten to Radison

Philippe Druez
Ghent University / KASK

The Kindergarten installation sends children's voices through the space, scattering from all walls and corners. Two

pan-tilt servo systems are pointing ultra-directional parametric speakers in all directions, controlled by a semi random algorithm. Children's voices can be heard in fragments, creating the confusing effect of sound coming from walls and existing only in one's head.
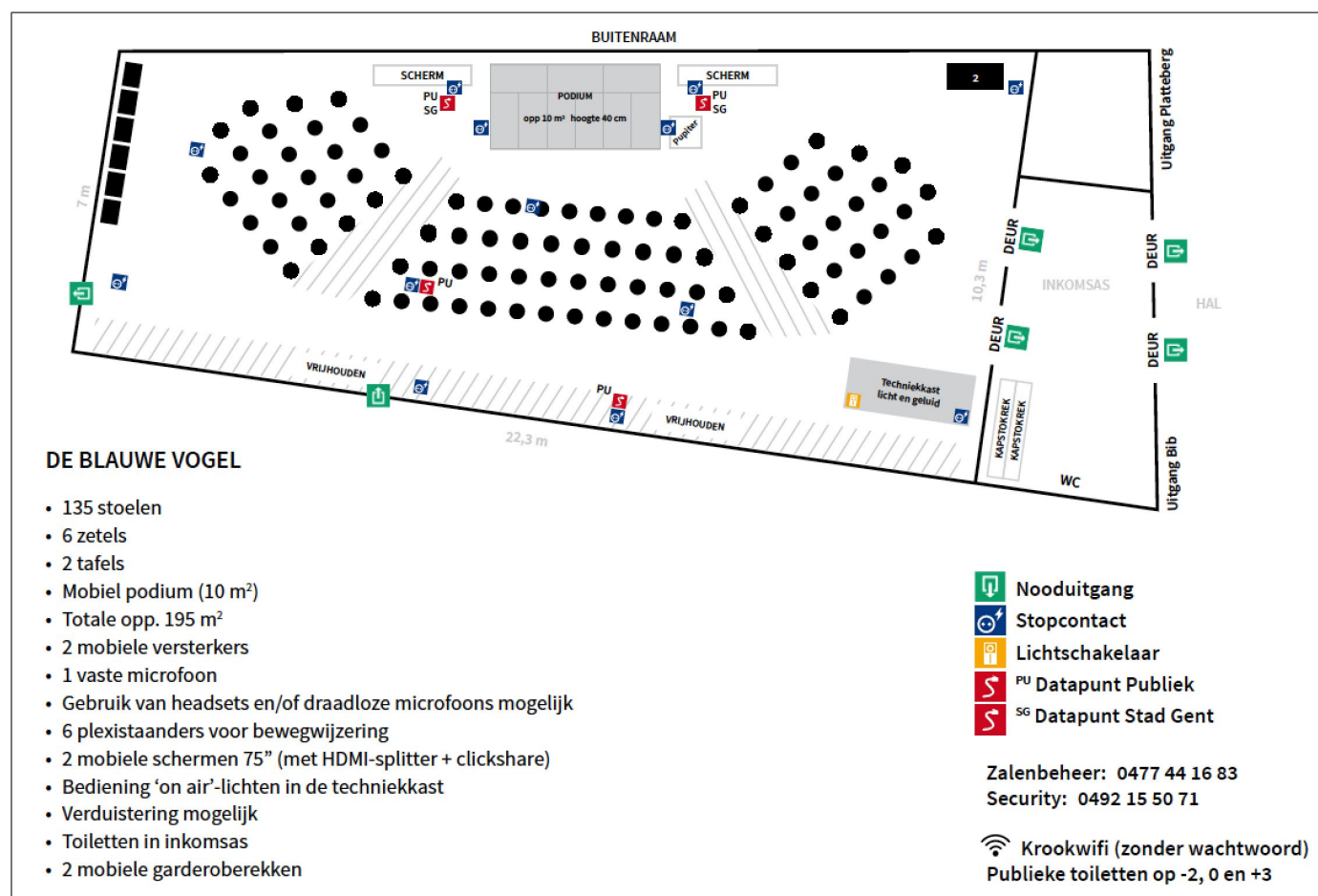
What started as an artwork with the aim to evoke a psychedelic effect turned out to be a versatile apparatus to direct sound in a narrow beam to very specific parts of an audience. The installation has therefore been adapted to control the motion and direction by any MIDI device. Musicians and composers can program or perform live with the Radison using a DAW, keyboard, pedals or MIDI instruments.

The technology to produce the directional sound beams is an ultrasound transducer array. The Radison (working title) fits into the range of specific (sound) art installations that due to their concept and design are often reusable as universal devices, such as the macePod. The work is part of the artistic doctoral research of the artist and explores the possibilities of holophony.
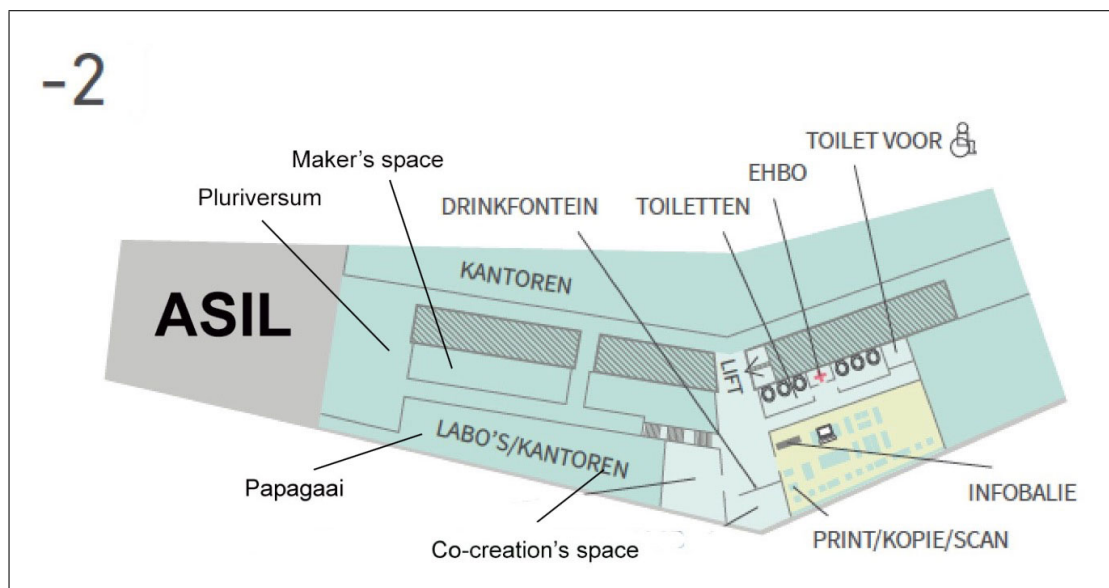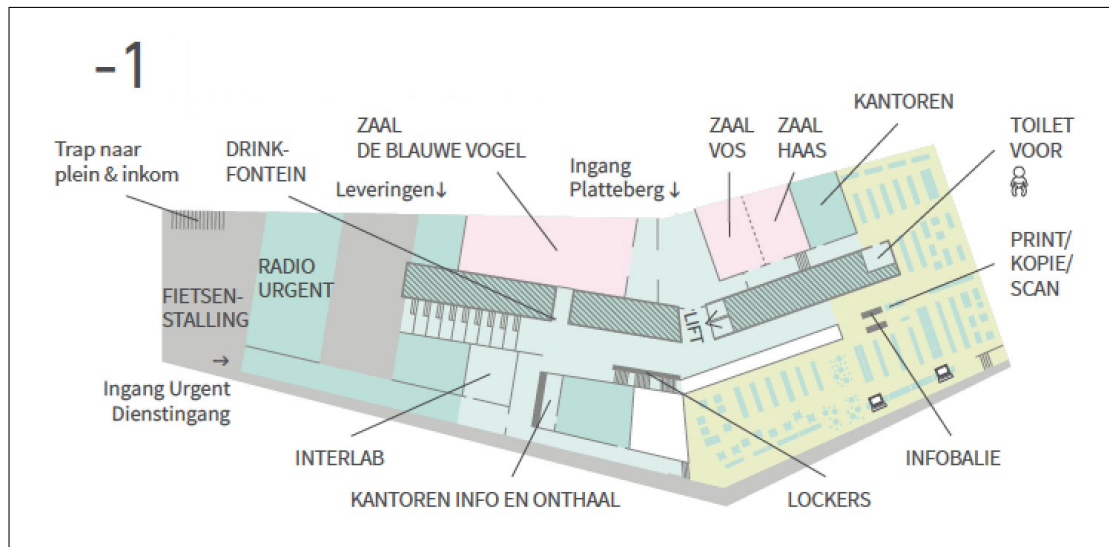
WiFi

De Krook provides WiFi throughout the building. There is no password for *krookwifi*, but you have to accept the terms and conditions. In case the pop-up dialogue with these terms doesn't appear automatically, just navigate to `dekrook.be` in your web browser.
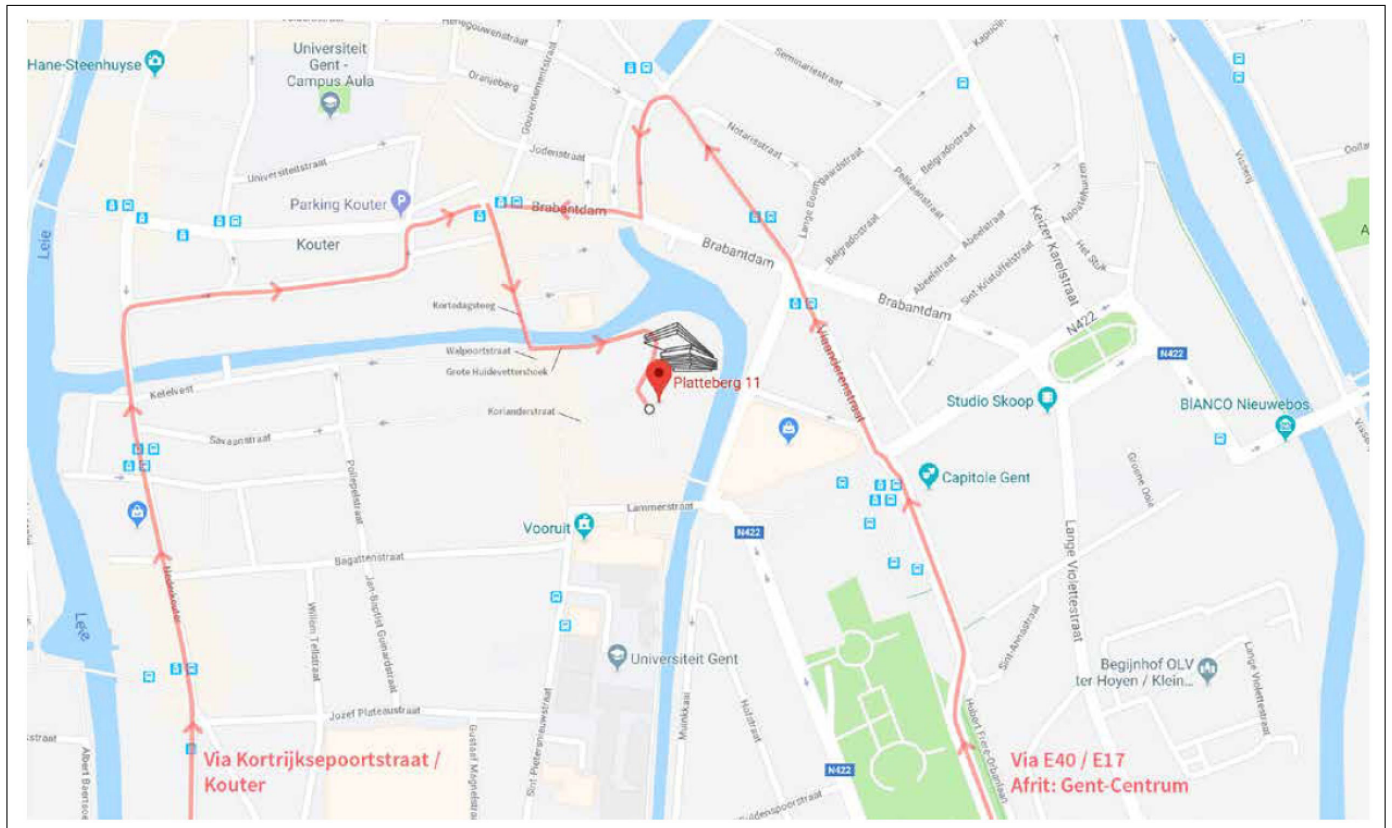
Info about the Blauwe Vogel:

DE BLAUWE VOGEL

- 135 stoelen
- 6 zetels
- 2 tafels
- Mobiel podium (10 m²)
- Totale opp. 195 m²
- 2 mobiele versterkers
- 1 vaste microfoon
- Gebruik van headsets en/of draadloze microfoons mogelijk
- 6 plexistaanders voor bewegwijzering
- 2 mobiele schermen 75" (met HDMI-splitter + clickshare)
- Bediening 'on air'-lichten in de techniekkast
- Verduistering mogelijk
- Toiletten in inkomsas
- 2 mobiele garderoberekken

Nooduitgang
Stopcontact
Lichtschakelaar
PU Datapunt Publiek
SG Datapunt Stad Gent

Zalenbeheer: 0477 44 16 83
Security: 0492 15 50 71

Krookwifi (zonder wachtwoord)
Publieke toiletten op -2, 0 en +3

Floor plans

Map of Ghent and De Krook

Emergency? Hope not! But in case:

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+44 7546 19 12 08