# 2022 HRI WINTER SCHOOL
## ON EMBODIED AI

**SURVIVAL GUIDE**
5-7 DECEMBER 2022
GENT, BELGIUM

GHENT UNIVERSITY

Flanders
State of the Art

VAIA

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# WELCOME!

Welcome to the first **Human-Robot Interaction Winter School** to be held in Ghent, Belgium! In this booklet, you will find more practical information about the winter school.

We have a very **rich and diverse programme** lined up for you. During three days, you will hear from experts in different subdomains of Human-Robot Interaction and Embodied AI. We'll get hands-on with social as well as technical aspects of our work, learn how to perform good research, and most of all: meet an incredible group of interesting people.

We're especially proud to welcome you in **Ghent** (or *Gent* in Dutch). It's the place to be for open-minded and creative people, being a centre for artists, poets, and architects. Much of the city's medieval architecture remains intact and is remarkably well-preserved and restored. Above all, it's a vibrant and quirky city, offering a fascinating cultural cocktail brimming with trendy, modern urban life - and it's a place where people enjoy life.

We are very pleased to have you, and hope that you will enjoy the coming three days with us!

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**Organising Committee**

Ruben Janssens
Pieter Wolfert
Kazi Haque
Anouk Neerincx

**Scientific Committee**

Tony Belpaeme
Maartje de Graaf
Zerrin Yumak

# CONTACT INFORMATION

There's a **Telegram group chat** with all participants and organisers. We will communicate practical information in this chat, and you can ask us and the other participants any question you want there. Join the group chat via this link: t.me/+kR537OVUM4c2MmNk.

There's also a **Padlet** where everyone can introduce themselves! Join in on www.padlet.com/rmajanssjanssens/vrpfmuzpbbjx66h8.

Do you need information or help quickly, or do you have a question that's specific to your situation? Feel free to contact any of the organisers via the contact information below. You can contact us using WhatsApp, Signal, Telegram, or good old-fashioned texts or phone calls.

**General email address**:
hri-winterschool@googlegroups.com

## ORGANISING COMMITTEE


**Ruben Janssens**

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# INCLUSIVE EVENT

The HRI Winter School aims to be an inclusive event. If you have specific needs, experience unsafe situations, or want to talk with one of the organizers about anything that has happened during the Winter School, please get in touch with us during or after the event.

We call all participants to be respectful towards other participants. Please respect each other's (physical) boundaries, and take special care in social situations where alcohol may be involved. There is a zero tolerance policy towards unwanted behaviour and/or (sexual) harassment. If such situations would arise, please do get in touch with our trusted persons.

## TRUSTED PERSONS

Are you experiencing a problem at the Winter School that you want to raise confidentially? You can contact our trusted individuals with any issue or remark. They will handle this confidentially and mediate where wanted.

The **four organizers** listed above serve as trusted persons. In addition, **two participants** who are not part of the main organizing team are also available as trusted persons.

**Maria Jose Pinto Bernal**

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mariajose.pintobernal@ugent.be

**Sofie Labat**

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sofie.labat@ugent.be

# LOCATIONS

During the Winter School, we will visit a few different locations throughout Ghent. You can find all addresses here. In case you've got trouble finding one of the locations, just call us.

## LIBRARY DE KROOK

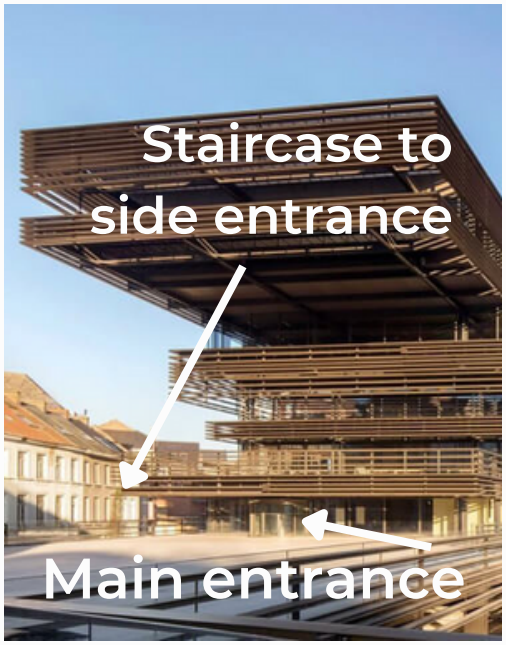
**Main programme (day 1)**

**Room:** Zaal De Blauwe Vogel
**Address:** Platteberg 11, 9000 Gent

**NOTE**: You cannot use the main entrance of the library!

You can access the entrance via the street "Platteberg", or via a staircase that goes down from the square in front of the main entrance (see the pictures below) (Miriam Makebaplein 1, 9000 Gent).

We will clearly mark the entrance and welcome you there on Monday morning. If you are late and the door is locked, call one of the organisers.



## WOODROW WILSONPLEIN

**Bus departure and arrival location (day 1)**

**Address:** Woodrow Wilsonplein, 9000 Gent

We will walk from De Krook to the bus together at the end of the sessions at day 1. At the end of the day, the bus will drop you off back on the Woodrow Wilsonplein.


## IGENT, CAMPUS ARDOYEN

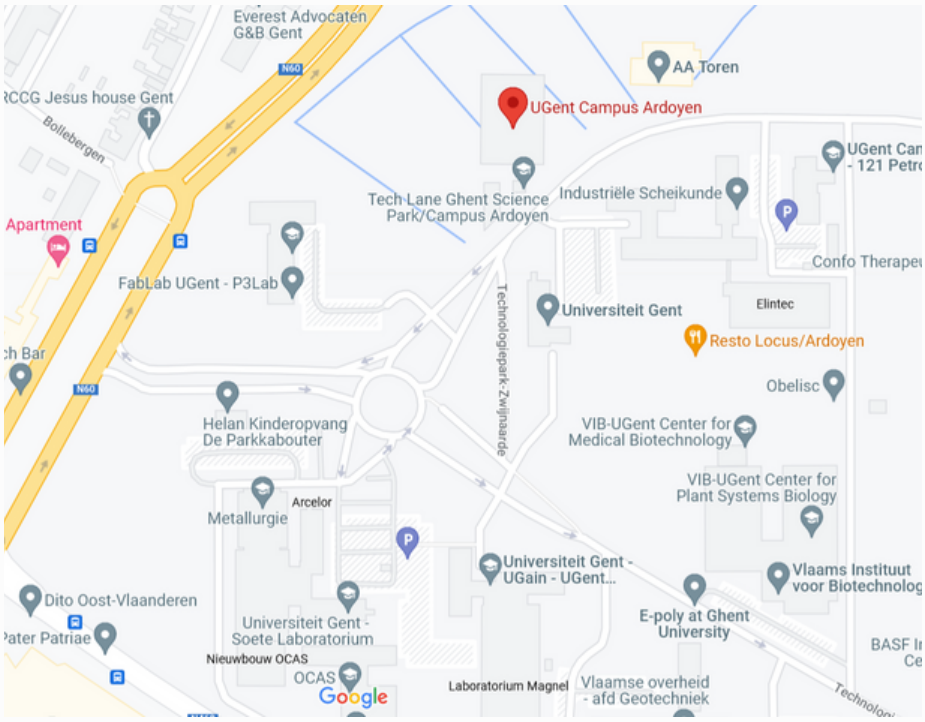
**Lab visit and reception (day 1)**

**Address:** Technologiepark-Zwijnaarde 126, 9052 Gent

The lab tour takes place on the 8th floor, the reception on the 12th floor.

A chartered bus will transport you from the Woodrow Wilsonplein to iGent and back.

In case you want to take your own transport (e.g. to leave earlier), you can use bus stop Zwijnaarde Bollebergen (ca. 5 minutes by foot) or tram stop Zwijnaarde Klaartestraat (ca. 18 minutes by foot).

## HET PAND

**Main programme (day 2 & 3)**

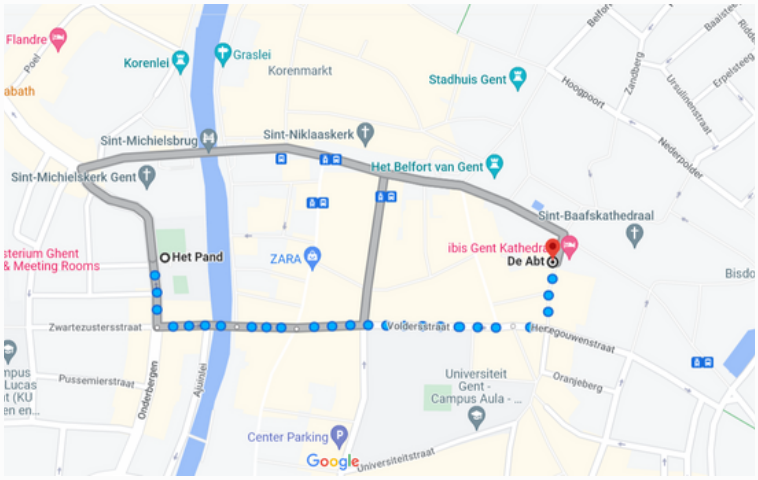
**Room:** Zaal Rector Vermeylen
**Address:** Onderbergen 1, 9000 Gent

Het Pand is Ghent University's convention and cultural centre. It's housed in an old Dominican monastery located in the heart of the city on the banks of the river Leie. The first traces of the complex date back more than 800 years, to the year 1201!


## DE ABT

**Dinner (day 2)**

**Address:** Lange Kruisstraat 4, 9000 Gent




# PROGRAMME OVERVIEW

Detailed descriptions of all sessions, including the lab tour and poster sessions, can be found in the next chapter.

We welcome you to arrive each day between 8:30 and 9:00. On day 1, you're expected in libraray De Krook (see route description in the previous chapter), on days 2 and 3, we expect you in Het Pand. Please arrive with time to spare on day 1, so we don't have to handle everyone's registrations at 9:00. You can already start meeting people, or check out the cool library.

## DAY 1: MONDAY 5 DECEMBER

**8:30** Doors open, registration — **LIBRARY DE KROOK**
**9:00** Welcome and opening of the day
**9:10** **Keynote:** Human-Robot Interaction as a uniting research endeavour (Tony Belpaeme)
**10:00** Q&A
**10:15** Coffee break
**10:30** **Tutorial:** Using the Furhat robot for Natural Language Understanding (Nils Hagberg)

**12:00** Lunch

**13:00** **Keynote:** Human-Robot Interaction in the real world (An Jacobs)
**13:45** Q&A
**14:00** **Keynote:** Embodied Virtual Agents (Zerrin Yumak)
**14:30** Coffee Break
**15:00** **Keynote:** On Artificial Moral Agents (Katleen Gabriels)
**15:45** Q&A

**16:00** Bus transport to the lab — **DEPARTURE: WOODROW WILSONPLEIN**

**17:00** **Lab tour** — **IGENT, CAMPUS ARDOYEN**
**18:00** **Reception** with pizza!

**20:00** Bus transport to the city centre — **ARRIVAL: WOODROW WILSONPLEIN**

## DAY 2: TUESDAY 6 DECEMBER

**8:30** Doors open — HET PAND
**9:00** Welcome and opening of the day
**9:10** **Keynote:** The Crux with Emotions:
They're a headache, but you can't be happy without them (Arvid Kappas)
**10:00** Q&A
**10:15** Coffee break
**10:30** **Tutorial:** Facial Affect Recognition for Human-Robot Interaction (Nikhil Churamani)

**12:00** Lunch

**13:00** **Tutorial:** Participatory Design (Katie Winkle)
**14:30** **Tutorial:** Quantitative Methods (Ruud Hortensius)
**16:00** **Poster session** with coffee (group 1)
**17:00** **Tutorial:** Experimental Design (Mark Neerincx and mentors)
**18:30** Scheduled end of the sessions

**19:30** **Dinner** — DE ABT

## DAY 3: WEDNESDAY 7 DECEMBER

**8:30** Doors open — HET PAND
**9:00** Welcome and opening of the day
**9:10** **Demonstration:** Performing Arts and Robotics
(Maaike Bleeker, Irene Alcubilla Troughton, and Kim Baraka)
**10:40** Coffee break
**11:00** **Tutorial:** AI in society (Maartje de Graaf)

**12:30** Lunch

**13:30** **Keynote:** Conversational HRI - coordinating human-robot teams with Natural Language
(Oliver Lemon)
**14:15** Q&A
**14:30** **Tutorial:** Introduction to Natural Language Processing (Thomas Demeester)
**16:00** **Poster session** with coffee (group 2)
**17:00** **Keynote:** Can computers have a sense of humour? (Thomas Winters)
**17:45** Q&A
**18:00** Closing of the Winter School
**18:15** Scheduled end of the Winter School

# SESSION DESCRIPTIONS

## DAY 1: MONDAY 5 DECEMBER

### KEYNOTE: HRI AS A UNITING RESEARCH ENDEAVOUR

**Prof. Tony Belpaeme (Ghent University)**

Human-Robot Interaction, the design and study of how we people interact with robots, is without a doubt on of the most fascinating fields to in science and technology today. Not only because of the novelty of the challenges posed by HRI, but also because it is one of the few fields that brings together so many disciplines. The old idea of “university”, the place where all subjects are studied, is revived in HRI, and while HRI finds its origins in technical research, its implications reach far and wide, welcoming contributions from fields well beyond engineering and making robots better for it.

### TUTORIAL: USING THE FURHAT ROBOT FOR NATURAL LANGUAGE UNDERSTANDING

**Nils Hagberg (Furhat Robotics)**

Nils Hagberg is giving a tutorial on the Furhat Platform. We will specifically focus on the Natural Language Understanding in Furhat in the Skill Framework. For this, we will use the Virtual Furhat, and the Kotlin Skill API. During this tutorial we will write a skill together.

### KEYNOTE: HOW TO STUDY FUTURE HUMAN ROBOT INTERACTION IN THE WILD

**Prof. An Jacobs (Vrije Universiteit Brussel)**

In this talk Prof An Jacobs will illustrate and explain how their team tries to elicit information of the potential use and non-use of robotics in the wild into robotic innovation projects, to create a sound base and iterative evaluation of the human perspective on the envisioned human-robot interaction, and thus help to create solutions that indeed support our quality of life and work

## KEYNOTE: EMBODIED VIRTUAL AGENTS

**Dr. Zerrin Yumak (Utrecht University)**

With the recent advancements in computer graphics, 3D virtual humans reached to a level of very high appearance realism. They take place in a range of applications such as games, chatbots for customer service and finance, simulations for education and healthcare, remote communication and (social) VR. Yet, their interactivity and movement is limited. We as humans are very receptive of non-verbal behaviors when we engage in social and emotional interactions. In order to interact with virtual humans naturally, they should also be equipped with non-verbal communication skills such as facial expressions, gestures and gaze. As they take place in more interactive applications, the demand to automatically generate their behavior on-the-fly will increase. This talk will discuss the role of AI and machine learning algorithms to generate the behavior and movement of virtual humans. Dr. Yumak will present the state-of-the-art and some of our research work on interactive virtual humans.

## KEYNOTE: ON ARTIFICIAL MORAL AGENTS

**Dr. Katleen Gabriels (Maastricht University)**

Dr. Katleen Gabriels is a moral philosopher, assistant professor at Maastricht University in the Netherlands and specialized in computer and machine ethics. Her doctoral research focused on virtual moral life, and she has conducted empirical studies in the then popular social virtual world Second Life. In her keynote, she will talk about her research on Second Life, as well as the relation between technology and morality, and the question concerning moral decision-making by Artificial Moral Agents (AMAs).

## LAB TOUR

**Researchers at IDLab-AIRO and IDLab-T2K**

We'll show you around our robot lab in the iGent building on Ghent University's engineering campus Ardoyen. In our lab, you'll be able to see demos of research about social robots, smart robot manipulation, STEM education, automatic sign language translation, and natural language processing for education. To wrap everything up, we invite you for a reception with pizza on our panoramic top floor!

# DAY 2: TUESDAY 6 DECEMBER

## KEYNOTE: THE CRUX WITH EMOTIONS: THEY'RE A HEADACHE, BUT YOU CAN'T BE HAPPY WITHOUT THEM

**Prof. Arvid Kappas (Constructor University)**

Robots and AI have a long history dominated by logic and rationality. In recent years, interest in adding emotions to the mix has increased in the context of the growth of the areas of Affective Computing and Social Robotics. Frequently, there is an interest in improving human-robot interaction by focusing on externally visible behavior - be it to make the behavior of a robot or agent contingent on the expressive behavior of the human or have the artificial entity display behaviors that are inspired by or mimic human behavior. Prof. Kappas will revisit emotion theory and research to highlight challenges to existing approaches in HRI from the point of view of psychology.

## TUTORIAL: FACIAL AFFECT RECOGNITION FOR HUMAN-ROBOT INTERACTION

**Nikhil Churamani (Cambridge University)**

Understanding human affective behaviour may be imperative for robots to interact with individuals in a naturalistic manner that may also be enriching. Evaluating human facial affect can provide a straightforward way to apprehend an individual's experience interacting with the robot and can provide meaningful and actionable information to the robot. This tutorial will explore the Facial Affect Recognition pipeline, especially under Human-Robot Interaction (HRI) settings. It will provide a hands-on walkthrough of the different steps, including (a) Face Detection, (b) Pre-processing, (c) Feature Extraction, and (d) Affect Recognition using conventional and deep Machine Learning (ML) methods. Finally, it will present the motivations for (e) employing personalised facial affect recognition models that continually learn and adapt towards individual users. The tutorial will also discuss the pitfalls to avoid in the real-world application of facial affect recognition methods for HRI. This tutorial aims to enhance the theoretical understanding of facial affect recognition and provide a hands-on experience in implementing such methods for the attendees.

## TUTORIAL: PARTICIPATORY DESIGN

**Dr. Katie Winkle (Uppsala University)**

In this tutorial, Dr. Katie Winkle will show us how we can use participatory design methods to make sure our robot applications fit the needs and expectations of our future users. She will first introduce us to different, relevant participatory design methods, after which you will get the opportunity to plan out a participatory design session yourself, in groups.

## TUTORIAL: QUANTITATIVE METHODS

**Dr. Ruud Hortensius (Utrecht University)**

In this tutorial, Dr. Ruud Hortensius will give an introduction to relevant quantitative methods, after which you will work on different cases in groups, evaluating which quantitative methods you would use to answer the research questions presented. In the end, we will together evaluate the outcomes.

## POSTER SESSIONS

**You!**

On days 2 and 3, we'll spend an hour getting to know everyone with posters. You will be divided in two: the first half of the group will present on day 2, the other half on day 3. When you're not presenting, you can walk around the posters and get to know the other participants' research.

## TUTORIAL: EXPERIMENTAL DESIGN

**Prof. Mark Neerincx (TU Delft & TNO)**
**Mentors: Tony Belpaeme, Katie Winkle, Maartje de Graaf, Zerrin Yumak, Ruud Hortensius**

Under supervision of our mentors you will design an experiment, and discuss existing experiments you have perhaps already ran during your research.

# DAY 3: WEDNESDAY 7 DECEMBER

## DEMONSTRATION: PERFORMING ARTS AND ROBOTICS

**Prof. Maaike Bleeker, Irene Alcubilla Troughton, Dr. Kim Baraka (Utrecht University)**

Our tutorial will address the use of the performing arts (theatre, dance, etc.) in thinking about and designing human-robot interactions differently. The speakers will offer an introduction of what the performing arts have to offer, followed by some improvisation exercises to physically experience what this perspective brings to interactions. Afterwards, we will focus on one of our case studies: a robot that interacts with humans in rule-based improvisation movement games. People can then get a chance to experiment with a demo of our robot improviser Pepper, after which we will engage in a discussion.

## TUTORIAL: AI IN SOCIETY

**Dr. Maartje De Graaf (Utrecht University)**

In this tutorial, we explore together what kind of roles and tasks social robots could (not) and should (not) take in our society. Dr. Maartje de Graaf will first give a short overview of her research on this topic, after which we will together evaluate and discuss potential opportunities and risks for social robots in society.

## KEYNOTE: CONVERSATIONAL HRI – COORDINATION OF HUMAN-ROBOT TEAMS WITH NATURAL LANGUAGE

**Prof. Oliver Lemon (Heriot-Watt University)**

Prof. Lemon argues that conversational Natural Language interfaces for robots and AI systems are an essential ingredient for future applications, in particular where diverse teams of robots, AIs and humans will need to work together. To illustrate the research challenges and our recent advances towards this vision, he will present results from a series of projects.

He will first summarise our results from recent projects on task-based conversation (JAMES, MuMMER, SPRING, SimBot), where his team is developing multi-party and multimodal conversational interfaces for robots, supporting visually grounded conversation with multiple humans.

As well as being useful for specific tasks, conversational interaction also needs to be engaging and informative, leading to our work on the Amazon Alexa Prize system "Alana", which develops open-domain social conversational companions. Prof. Lemon concludes with some open research directions for future advances in conversational HRI, focussing on collaborative dialogue in human-robot teams to coordinate shared tasks.

## TUTORIAL: RECENT TRENDS IN NATURAL LANGUAGE PROCESSING

**Prof. Thomas Demeester (Ghent University)**

Prof. Demeester will take us on a journey in the world of Natural Language Processing. He'll first illustrate why ambiguity in language makes automated processing of language a challenge. After a short overview of the ruling paradigms that have defined the NLP domain over the past decades, he will zoom in on the generative models that are all the rage right now. We'll then experiment with these models ourselves, take a look at what they really can generate, and how we can work with them in Python.

## KEYNOTE: CAN COMPUTERS HAVE A SENSE OF HUMOUR?

**Thomas Winters (KU Leuven)**

At first glance, computers writing humor may seem paradoxical, given that humor is an intrinsically human trait. By limiting the scope to specific types of jokes and by hand-coding rules for them, researchers generally have been able to create several methods for detecting and generating humor. Recently, large scale pre-trained language models opened the way for learning even better insights into humor. By engineering the right prompt, they can even follow joke instructions to successfully create decent punchlines. In this talk, Thomas provides an overview of the history of computational humor, discusses several types of humor tasks that have been automated using artificial intelligence and illustrates several useful applications of computational humor.

# TRANSPORTATION IN AND AROUND GHENT

## GETTING TO GHENT

Ghent has two main **train stations**. Gent-Dampoort is the station that is closest to the city centre. Trains from Antwerp (for people travelling from the Netherlands) will first pass this station before they continue towards Gent-Sint-Pieters.

From **Gent-Dampoort** it is a 10-minute walk to the city centre and there's plenty of buses departing there too.

From **Gent-Sint-Pieters** trams and buses can bring you to the city centre. Both Line 1 and Line 2 can bring you to the city centre, depending on where in the city centre you need to be.

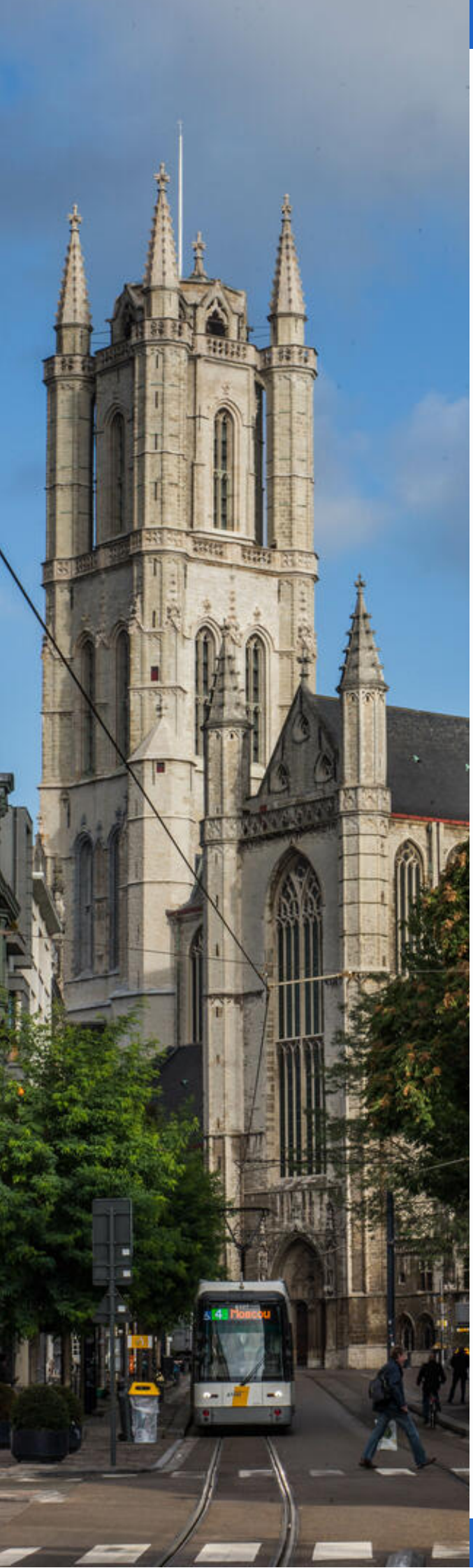
For trains, you can use the SNCB/NMBS app to get real-time information and buy your **tickets**. They can also be bought online at www.belgiantrain.be/en, or in ticket machines that are found at every station.

Choose the Standard Ticket, or, if you're under 26, a Youth Ticket might be cheaper, depending on the distance.

Train tickets are valid for one trip at any time of the day you choose, and you can sit wherever you like in the class you've chosen. A conductor will check tickets during your train ride.

If you arrive by aeroplane in **Brussels Airport (BRU)**, you can take a direct train from the train station that's underneath the airport to Gent-Sint-Pieters or travel via Brussels South (Brussel-Zuid in Dutch and Bruxelles-Midi in French) station to switch to a train that will bring you to Ghent. It should take around an hour. Fast trains are called "IC" or "P" trains. Do not take the IC train that travels via Aalst/Alost: that one takes twice as long as the direct one! You'll have to show your ticket to get in and out of the Brussels Airport train station.

If you are arriving in **Brussels South airport (CRL)**, which is misleadingly named as it's actually in Charleroi, a good option to travel to Ghent is using the Flibco bus service (www.flibco.com/en/lines/shuttle-ghent-charleroi-bus).



## TRAVELLING IN GHENT

Ghent is a small city that's easilly travelled by foot or - as the locals prefer - by bicycle.

There's good public transport available as well. Ghent has three **tram lines** and multiple **bus lines**, all operated by the company **De Lijn**. Beware that no public transport is operating after 1 am.

A single ticket costs €2.5. You can buy tickets for buses and trams at the tram stops, pay contactless with your debit card, or buy a ticket in the app.

To get detailed route information, you can install the 'De Lijn' app from the Apple or Play store. Google Maps shows the bus and tram routes too, but does not show delays or cancellations (which might happen with buses).

You can also take a **shared bicycle**. There are two bike-sharing apps available in Ghent: Donkey Republic for normal bikes, and Dott for electric bikes.

If you are used to cycling in the Netherlands, we would advise you to be more aware of your surroundings than you would normally be. In general, cycling in Ghent is a lot of fun and there are many roads specifically dedicated to cyclists to get you quickly in and out of the city centre.

If you go on the road in the evening or in bad weather conditions, make sure to check that your lights and brakes work, since non-working lights can result in a fine. Also be aware that if you are intoxicated by alcohol, it is not officially allowed to ride a bicycle, and you could get a fine for this (although the chance of this happening is very small).

**Taxis** are available in Ghent as well, but they can be very expensive (up to 20 euros for a 5 km / 15-minute ride). Taxi apps are not allowed in Ghent, but you can find an overview of available taxi companies on visit.gent.be/en/good-know/practical-information/getting-around/taxis.

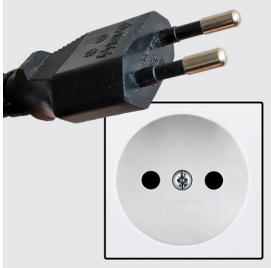
# HOW TO SURVIVE IN BELGIUM

## PHONE NUMBERS

The national dialling code is +32. The emergency phone number is 112.

## POWER SOCKETS

We use type E power sockets—the same as in France, but compatible with type C and F (used in most of continental Europe).



## TIME ZONE

Belgium is in the Central European Time zone. Right now, we're not using Daylight Savings Time, so we're in UTC+1.

## LANGUAGE

Belgium has three official languages: Dutch, French, and German! How this is divided within the country is a day-filling discussion, but in Ghent, we speak Dutch (or its Flemish dialect, to be more precise). Almost everyone here speaks English, so you shouldn't have a problem communicating here.

Some useful words:
Yes / No - Ja / Nee
Hello / Goodbye - Hallo / Tot ziens (or salut)
Thank you - Bedankt (or merci)
How much does it cost? - Hoeveel kost dit?
Bathroom - WC/Toilet

## CURRENCY

We use the euro (€) as currency. You can pay by card almost everywhere, although there might be a few stubborn small shops that only allow you to pay cash or by a (Belgian) payment app.

## COVID-19 RESTRICTIONS

Face masks are no longer required anywhere in Belgium, except for in hospitals, and in farmacies in Brussels and Wallonia.

## SHOPS

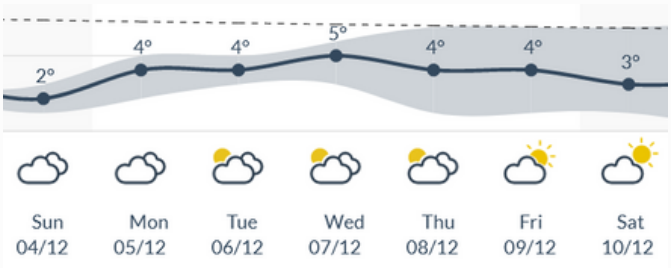
Supermarkets will close at 20:00 - other shops can already close at 18:00. There are some night shops (“nachtwinkel” in Dutch), which are open late, but they are much more expensive.

## RESTAURANTS

Dinner time in Belgium is somewhere between 18 and 21. Restaurants will be open during these hours. It is not mandatory to tip in a restaurant, but it might be seen as a nice gesture.
Drinking water in addition to your meal is often not free in Belgian restaurants.

## WEATHER

Belgium is not known for its nice weather. It will be rather cold during the days of the Winter School: temperatures will range between -2˚C and 4˚C. Make sure to dress appropriately. This means having gloves, a hat and a scarf. A proper winter coat is definitely advised, as well as warm shoes. It doesn’t look like it will rain a lot, but this is always possible here, so make sure to check your coat is watertight. If you want, you can bring an umbrella.




## ALCOHOL

The beers in Belgium are much stronger than the ones found in neighbouring countries. Especially blond or triple beers can go up to 12% alcohol, experience has taught some of the organizers that it’s often better to skip the last one ;-). Although being close to the Netherlands, soft drugs are not allowed in Belgium.

# TIPS FROM THE ORGANISERS

If you have some extra time in Ghent, here are our inside tips for Ghent. Belgium is known for its quality cuisine, and Ghent is the vega(n) capital of Belgium. All restaurants listed below will have vegetarian options. Want to go sightseeing? Check out the hotspots on visit.gent. The Ghent University Museum (GUM) is definitely recommended :)

## RESTAURANTS

- Belgian Fries ('De Frietketel' & 'Frituur Tartaar' are among our favourites)
- Mission Masala (Indian fusion)
- Fattoush Gent (Syrian cuisine)
- Greenway Gent (vegetarian)
- Mosquito Coast (international)
- Chapeluur (Croquettes)
- Meme Gusta (Belgian cusine)
- De Stokerij (Belgian cuisine)

## BARS

- Bar Popular (www.polepole.be)
- Trollekelder (large selection of Belgian beers)
- 'T Dreupelkot (traditional Jenever bar, cash only)
- The Glengarry (large selection of whiskies, www.theglengarry.be)
- Jan van Gent
- Le Bal Infernal (books and drinks!)

## BREAKFAST AND BAKERIES

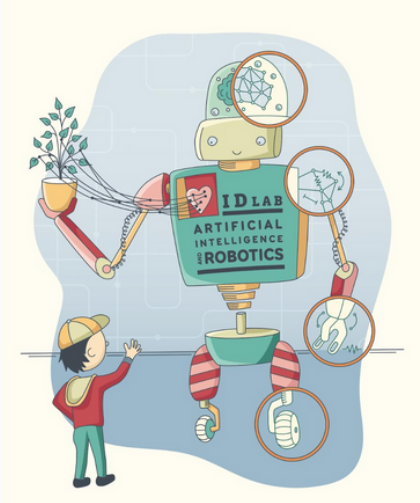
- Marijn Coertjens (handmade croissants and pastries, best in Belgium)
- Luv l'Oeuf (breakfast)
- Oats Day Long (oats, all day)
- Bakkerij Himschoot (bakery with freshly made sandwiches)
- Julie's House (cakes and pastries)
- Simon Says (breakfast)
- Take Five Espressobar (espresso, what else?)

# ORGANISING INSTITUTIONS

**Ghent University** is an internationally renowned, open, pluralistic and socially engaged university in Belgium. It is more than 200 years old, offers more than 200 programmes (including 64 English-taught master's programmes), which attract 50,000 students, and conducts in-depth research within a wide range of scientific domains with its 8,200 academic staff members, of which 12% are international. Our credo is Dare to Think: we are a haven for courageous thinkers. Learn more about us at www.ugent.be/en.

GHENT UNIVERSITY

Specifically, the Winter School is organised by the **AI & Robotics (AIRO)** team of IDLab at Ghent University. AIRO is a team of about 30 researchers who work on interdisciplinary research in the fields of AI and Robotics, ranging from social robotics to fringe machine learning. You will get to know us during the lab visit on Monday! Discover our research team at airo.ugent.be.




**IDLab** is a 250-researcher strong research group focusing on future technologies, including AI, robotics, and IoT. IDLab is embedded in Ghent University and the University of Antwerp, and is a satellite of **imec**, a large high-tech research institute that employs around 4,000 researchers from more than 90 countries. imec is also part of euROBIN, a unified European platform for R&D on AI-driven robotics.

IDLab
INTERNET & DATA LAB

euROBIN

DOCTORAL SCHOOLS

GHENT UNIVERSITY

The Winter School would not be possible without the financial support from the **Doctoral Schools** office of Ghent University. They support doctoral students during their doctoral research by providing training and professionalisation, course funding, and practical support.

Flanders
State of the Art

The Winter School is also supported by the **Flemish Government**.

VAIA

The Winter School is organised jointly with **VAIA, the Flemish AI Academy**, is a collaboration between Flemish higher education institutions that aims to let professionals and researchers learn about AI. Check out their offering at www.vaia.be/en/!

Utrecht University

Finally, the Winter School is organised together with **Utrecht University**. Utrecht University is a public research university with 7 faculties and one of the oldest universities of the Netherlands, established 26 March 1636, as well as one of the biggest, attracting around 30,000 students and 8,000 faculty members. The university is ranked as the best university in the Netherlands by the Shanghai Ranking of World Universities 2022, ranked 14th in Europe and 54th in the world. The university's motto is “Sol Iustitiae Illustra Nos”, which means "May the Sun of Righteousness Enlighten Us".

Learn more about us at www.uu.nl/en/.