University of Amsterdam

# ABC Summer School

# Musicality

## Unraveling our capacity for music

## 14-24 June 2021

**Lecturers**

**Prof. dr. Carel Ten Cate**
Leiden University

**Prof. dr. Julia Kursell**
University of Amsterdam

**Prof. dr. Elizabeth Hellmuth Margulis**
Princeton University

**Dr. Miriam Mosing**
University of Melbourne

**Prof. dr. Isabelle Peretz**
University of Montréal

**Dr. Patrick Savage**
Keio University

**Prof. dr. Sandra Trehub**
University of Toronto Mississauga

**Prof. dr. Henkjan Honing**
**Dr. J. Ashley Burgoyne**
**Dr. Makiko Sadakata**
**Dr. Fleur L. Bouwer**
Music Cognition Group,
University of Amsterdam

**Master Classes**
from renowned experts in the field of cognitive, computational and comparative musicology, philosophy of science, (cognitive)neuroscience, genetics and biology

**Organizers**
Music Cognition Group,
University of Amsterdam

**Research projects**
supervised by expert tutors

**Closing lecture**
Prof. dr. David Huron
Honorary Frijda Chair in Cognitive Sciences

**4 EC**
after completion of the Summer School

## Register now!

**For registration & more information:**
**www.mcg.uva.nl/summerschool**

abc amsterdam brain & cognition

# Getting started

## Musicality

Research shows that all humans have a predisposition for music, just as they do for language. All of us can perceive and enjoy music, even if we can't carry a tune and consider ourselves "unmusical." This Summer School offers interdisciplinary perspectives on the capacity to perceive, appreciate, and make music. Scholars from biology, musicology, (cognitive) neuroscience, philosophy of science, genetics, computer science, psychology, and other fields consider what music is for and why every human culture has it; whether musicality is a uniquely human capacity; and what biological and cognitive mechanisms underlie it.

## Masterclasses and research project

The two-week international Summer School from 14 June till 24 June 2021 will consist of a series of Master Classes, each one given by a renowned expert in the field. In addition, students will work in groups with a designated tutor, on a research project within the broad topic of musicality, which they will present towards the end of the Summer School. Besides the masterclasses and workshops, an opportunity to get in contact with peer students in the field will be offered as well. The Summer School classes will be taught online, with – if the pandemic allows– a hybrid closing symposium at *De Balie* in Amsterdam.

## Provisional Time Schedule

(N.B. For the latest version see website.)

**Week 1**

| **Monday 14 June 2021** | | |
|---|---|---|
| 10:00-10:30 CEST | Welcome by Henkjan **Honing** [host] and Vincent **Tijms** [IIS] | **Plenary** |
| 10:30-10:45 | Break | |
| 10:45-12:00 | Henkjan **Honing:** *Introduction and Overview* | **Lecture** |
| 12:00-13:00 | Break | |
| 13:00-13:45 | Plenary session followed by tutorials per domain | **Plenary** |
| | Students share topics of interest and form subgroups | **Tutorials** |
| 13:45-14:00 | Break | |
| 14:00-15:00 | Subgroups discuss their topics in breakout rooms to reach consensus on what interests them | **Tutorials** |
| 15:00-15:30 | Break | |
| 15:30-16:00 | Pitches and discussions of preliminary RQs | **Plenary** |
| 16:00-17:00 | Online drinks with all the tutor groups | **Social event** |

| | Tuesday 15 June 2021 | |
|---|---|---|
| 10:00-10:15 | Day opening by Makiko **Sadakata** [host] | **Plenary** |
| 10:15-11:00 | Makiko **Sadakata**: *Cognitive musicology* | **Lecture** |
| 11:00-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Prepare questions for Q&A w/ Margulis | |
| 12:00-13:00 | Break | |
| 13:00:14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 14:30-15:00 | Break | |
| 15:00-16:00 | Lisa **Margulis:** *Conceptualizing musicality* | **Lecture** |
| 16:00-16:30 | Q&A | **Plenary** |
| 16:30:17:30 | Plenary session where subgroups pitch final research question | **Plenary** |
| | Close of the day | **Plenary** |

| | Wednesday 16 June 2021 | |
|---|---|---|
| 10:00-10:15 | Day opening by Fleur **Bouwer** [host] | **Plenary** |
| 10:15-11:30 | Watch pre-recorded video \| Isabelle **Peretz** | **Self-study** |
| 11:30-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Discuss video and prepare questions for Q&A w/ Peretz | |
| 12:00-13:00 | Break | |
| 13:00-13:45 | Fleur **Bouwer**: *Cognitive neuroscience* [host] | **Lecture** |
| 13:45-14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 14:30-15:00 | Break | |
| 15:00-16:00 | Isabelle **Peretz:** *Online Q&A* | **Lecture** |
| 16:00-17:00 | [t.b.d.] | **Social event** |

| | Thursday 17 June 2021 | |
|---|---|---|
| 10:00-10:30 | Day opening by Henkjan **Honing** [host] | **Plenary** |
| 10:30-11:00 | Watch pre-recorded video \| Sandra **Trehub** | **Self-study** |
| 11:00-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Discuss video and prepare questions for afternoon lecture | |
| 12:00-13:00 | Break | |
| 13:00:14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 14:30-15:00 | Break | |
| 15:00-16:00 | Sandra **Trehub:** *Musical beginnings: Perception and Production* | **Lecture** |
| 16:00-17:00 | Q&A | **Plenary** |
| | Close of the day | **Plenary** |

| | Friday 18 June 2021 | |
|---|---|---|
| 10:00-10:30 | Day opening by J. Ashley **Burgoyne** [host] | **Plenary** |
| 10:30-11:30 | J. Ashley **Burgoyne:** *Computational musicology* | **Lecture** |
| 11:30-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Debrief on *Spotify* as a research tool | |
| 12:00-13:00 | Break | |
| 13:00:14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Prepare questions for Q&A w/ Savage;<br>Finalize storyboard of research project | |
| 14:30-15:00 | Break | |
| 15:00-16:00 | Patrick **Savage:** *Comparative musicology* | **Lecture** |
| 16:00-17:00 | Q&A | **Plenary** |
| | Close of the day | **Plenary** |

**Week 2**

| | **Monday 21 June 2021** | |
|---|---|---|
| 10:00-10:30 | Day opening by Henkjan **Honing** [host] | **Plenary** |
| 10:30-11:30 | Carel ten **Cate:** *Comparative biology* | **Lecture** |
| 11:30-12:00 | Q&A | **Plenary** |
| 12:00-13:00 | Break | |
| 11:00-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 12:00-13:00 | Break | |
| 13:00:14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Prepare questions for Tuesday lecture | |
| 14:30-15:00 | Break | |
| 15:00:17:00 | [t.b.d.] | **Social event** |
| | | |

| | Tuesday 22 June 2021 | |
|---|---|---|
| 10:00-10:30 | Day opening by Henkjan **Honing** [host] | **Plenary** |
| 10:30-11:30 | Julia **Kursell:** *Philosophy of Science* | **Lecture** |
| 11:30-12:00 | Q&A | **Plenary** |
| 12:00-13:00 | Break | |
| 11:00-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 12:00-13:00 | Break | |
| 13:00:14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 15:00:17:00 | [t.b.d.] | **Social event** |
| | | |

| | Wednesday 23 June 2021 | |
|---|---|---|
| 10:00-10:30 | Day opening by Henkjan **Honing** [host] | **Plenary** |
| 10:30-11:00 | Watch pre-recorded video \| Miriam **Mosing** | **Self-study** |
| 11:00-12:00 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Discuss video and prepare questions for **Mosing** | |
| 12:00-13:00 | Break | |
| 13:00:14:30 | Breakout workgroups (chaired by tutors) | **Tutorials** |
| | Work on research projects | |
| 14:30-15:00 | Break | |
| 15:00-16:00 | Miriam **Mosing:** *Genetics & musicality* | **Lecture** |
| 16:00-17:00 | Q&A | **Plenary** |
| | Close of the day | **Plenary** |

| | Thursday 24 June 2021 | |
|---|---|---|
| 10:30-12:00 | Day opening by Henkjan **Honing** [host] and Vincent **Tijms** [IIS] | **Plenary** |
| | Plenary session where subgroups present their projects**lenary** | **Plenary** |
| 12:00-12:30 | Break | |
| 12:30-13:00 | Best Project Award; Close of Summer School | **Plenary** |

## Closing Symposium (Thu 24 June 2021)

**International Symposium**
[hybrid, from *grote zaal, De Balie, Amsterdam*]

| | *'A hybrid evening of research, music, and emotion'** | **Symposium** |
|---|---|---|
| 20:00-20:10 | Welcome by Henkjan **Honing** \| Co-host Ashley **Burgoyne** w/ Diamanda La Berge **Dramm** [5'] | |
| 20:10-20:20 | Introduction by Fleur **Bouwer** [moderator] | |
| 20:20:21:20 | David **Huron**, *Honorary Frijda Chair 2021* | |
| | Lecture: ***'Why do we enjoy listening to sad music?'*** | |
| 21:20-21:50 | Panel discussion: | |
| | Psyche **Loui** & Mariska **Kret** *discussants* | |
| 21:50-22:10 | Q&A with audience | |
| 22:10-22:25 | Music by Diamanda La Berge **Dramm** | |
| 22:25-22:30 | Close of online programme | |

*For the Symposium website: see here.

# Overview of speakers

## Prof. dr. Henkjan Honing

*University of Amsterdam, NL*

**Musicality: Introduction and a research agenda**

Over the years it has become clear that we all share a predisposition for music, just like we have for language. Even those of us who can't play a musical instrument or lack a sense of rhythm can perceive and enjoy music. I will refer to this unique predisposition – in all its complexity – as musicality, defined as a natural, spontaneously developing set of traits that are based on and constrained by our cognitive abilities and its underlying biology. As such, music – in all its diversity – can be defined as a social and cultural construct that is built on this musicality. This distinction might appear trivial, but it demarcates an important shift in music research from studying the structure of music (across cultures and species) to studying the structure of musicality, i.e. the cognitive and biological capacities that can give rise to music.

**Dr. Makiko Sadakata**

*University of Amsterdam, NL*

## Why it is fascinating to compare music and language

When do we hear music, what abilities do we need to appreciate music, and what sound characteristics contribute more and less to the perception of music? This introduction talk will discuss these questions by introducing some of the essential acoustic features and cognitive processes involved in the processing of music and language.

**Prof. dr. Elizabeth H. Margulis**
*Princeton University, US*

**Conceptualizing Musicality**

This talk considers the challenges involved in attempting to define and measure a construct like musicality, notions of which vary culturally. How can a humanistically informed perspective result in better scientific tools?

## Prof. dr. Isabelle Peretz

*Université de Montréal, C*

### Neurobiology of Congenital Amusia

The last decade of research has provided compelling evidence that musical engagement is a fundamental human trait, and its biological basis is increasingly scrutinized. In this endeavor, the detailed study of individuals who have musical deficiencies is instructive because of likely neuro-genetic underpinnings. Such individuals have "congenital amusia", an umbrella term for lifelong musical disabilities that cannot be attributed to intellectual disability, lack of exposure, or brain damage after birth. I will present key points that have emerged during recent years regarding the neurobiology of the disorder, and will focus on singing in particular.

**Dr. Fleur Bouwer**

*University of*

*Amsterdam, NL*

**Who's got rhythm?**

**Exploring the temporal aspects of music**

Rhythm is a fundamental element of music, and affects our movement, emotions, cognition, and social behavior. In this lecture I will explore the different elements of rhythms that we can perceive and use to guide our behavior, like the beat, the metrical structure, and the rhythmic pattern. I will discuss some evidence for the possible cognitive and neural mechanisms underlying the processing of these rhythmic components. Finally, I will show that while it seems that most people have a sense of rhythm (even small children tend to move to a beat) there are large individual differences in rhythmic abilities, and some people – related to Prof. Peretz's work – do not seem to have a sense of the beat at all.

## Prof. dr. Sandra Trehub

*University of Toronto Mississauga, C*

### Musical Beginnings

The presentation will highlight the following topics: (1) infants' ability to perceive and remember music and to acquire implicit knowledge about its features, (2) the nature of everyday exposure to music in infancy, (3) the social and emotional consequences of music for infant listeners, (4) the emergence of music-making skills in infants and toddlers, and (5) the implications of these abilities for debates about the biological or cultural origins of music.

**Dr. J. Ashley Burgoyne**

*University of Amsterdam, NL*

**What can music researchers do with Spotify**

Even users with free (ad supported) Spotify accounts have access to the Spotify API, a rich feature set for every track in Spotify's catalogue. It is easier to work with this API than many people realize, and this live, interactive demonstration will show you some of its capabilities. Dr Burgoyne will also share R code to replicate the analyses from this session on your own.

For those students with Spotify accounts, please prepare for this session by creating a playlist of music that you would like to learn more about – ideally two playlists that you would like to compare to one another.

## Dr. Patrick E. Savage

*Keio University, J*

**Comparative musicology:**

**The science of the world's music**

What is music, and why did it evolve? How can we understand the unity and diversity found throughout the world's music? Scientific attempts to answer these questions through cross-cultural comparison stalled during the 20th century and have only recently begun to make a resurgence. In this talk, I will synthesize recent advances to outline a new unified theoretical/methodological framework to understand and compare all of the world's music. This framework takes advantage of new scientific theories and methods - particularly from advances in computer science, psychology, genetic anthropology, and cultural evolution - to apply comparative musicological research to answer longstanding questions about the origins of music and to contemporary issues including music copyright law and UNESCO policy. In doing so, I argue for an inclusive, multidisciplinary field that combines the qualitative methods traditionally employed by musicologists and cultural anthropologists with quantitative methods from the natural sciences.

**Prof. dr. Carel ten Cate**
*Leiden University, NL*

## Searching for the roots of human musicality in other species

The universal presence of human musicality suggests it has evolutionary roots from before the evolution of modern humans. It raises the question about the presence of features of musicality in other species. In this talk I will discuss several approaches to examine the musicality of non-human animals and what kind of insights they may or may not provide. One such an approach is examination of whether animal vocalizations contain 'musical' features. Another one is to examine perceptual preferences of animals for particular features, such as consonance or rhythmicity. Next, I will go into more detail on an experimental approach, aimed at testing the presence of specific cognitive perceptual abilities underlying pitch and rhythm detection. Taken together, the various lines of evidence are suggestive of the presence of some features of human musicality in some animal species. While the current studies thus demonstrate that progress on understanding the animal roots of human musical abilities can be and is being made, the picture of what is shared and what not is still fragmentary due to the paucity of data and limited comparability between different animal experiments.

**Prof. dr. Julia Kursell**

*University of Amsterdam, NL*

## A query on tests: how research constitutes musicality

Musicality is a contested notion. Does it privilege certain individuals, styles, abilities over others? The lecture will look at how musicality has been tested. More specifically, I will argue that tests constitute what they test. Mirroring both our ideas on what music is and what we do when musicking, the test holds a key position in research on musicality. I will discuss examples that demonstrate how these ideas have changed. My main object of investigation will be the beginnings of research in musicality and, in particular, the writings of 19$^{th}$-century philosopher Carl Stumpf, who was credited by some to have been the first to test musicality. His endeavor to understand what the mind does when engaging with music will be read with a reference to Cathérine Malabou's recent book *Morphing Intelligence*. She asks how a notion of "intelligence" has come to replace the older notion of "intellect", enabling new research questions and applications. Her concerns about the extent to which AI's notions of intelligence and the philosophers' attempt to understand intellect are

heading towards the same or different objectives will guide me through my readings of Stumpf, asking: Can the notion of musicality, rather than privileging some, on the contrary, be seen to be inclusive in new ways?
During the seminars, I suggest analyzing and discussing how musicality tests during the past two centuries have modelled music and musicality. For an excellent concise overview see Isabelle Peretz's *Apprendre la Musique. Nouvelles des Neurosciences* (pp. 135-137). [Translated as: *How Music Sculpts Our Brain, 2020*]

**Dr. Miriam Mosing**

*University of Melbourne, AUS*

**Gene-environment interplay in musicality and music acquisition.**

Individual differences in musicality arise from processes involving both genes (G) and the environment (E). To understand the genetic architecture and GE interplay in complex traits and behaviors is one of the major challenges at the research frontier today and essential if we wish to better understand the processes underlying musicality and identify true causal environmental factors on music acquisition. In this lecture, I will provide an overview of the state of research on the genetics of musicality and provide examples from my work, highlighting how we can apply well established and novel methods using large scale twin and genetically informative data to enhance our understanding of the etiology of music.

## Honorary Frijda Chair in Cognitive Science

The Frijda Chair is named after Nico Frijda (1927-2015), who was professor of Psychology at the University of Amsterdam and a pioneer of cognitive science in the Netherlands. Each year, the Amsterdam Brain and Cognition center at his *alma mater* awards this chair to a prominent researcher in the field of brain and cognitive sciences, on the basis of outstanding interdisciplinary achievements.

In 2021, the *Honorary Frijda Chair in Cognitive Science* is awarded to **prof. dr. David Huron**.

Huron's lecture is called ***Why do we enjoy listening to sad music?*** and will be presented at the closing symposium held in the *de Balie* in Amsterdam (see website for the full programme).

David Huron is an Academy Professor Emeritus and Arts & Humanities Distinguished Professor Emeritus at The Ohio State University, where he holds joint appointments in the School of Music and in the Center for Cognitive and Brain Sciences. Trained as a performer, Huron worked for several years as a composer before turning to research.

Among other interests, Prof. Huron is especially interested in how music evokes emotion in listeners. In addressing such questions, Huron's research employs a range of methods, including perceptual and cognitive experiments, computer-based corpus studies, simulation and modeling, interviews and surveys, and physiological and endocrine studies. In addition, his research has drawn on traditional historical and analytic methods. Dr. Huron's research has been communicated in some 150 publications, including three books. Huron has delivered over 400 lectures in 25 countries, including 28 keynote conference addresses.

We are proud to have David Huron close our Summer School on Musicality on this exciting topic (See website for more information).

## Who we are

The ABC Summer School 2021 is organized by the Music Cognition Group (MCG), and supported by both the Institute of Interdisciplinary Studies (IIS) and the Amsterdam Brain and Cognition Centre (ABC).

### Institute of Interdisciplinary Studies (IIS)

The *Institute for Interdisciplinary Studies* (IIS) is the UvA's knowledge centre for interdisciplinary learning and teaching. It develops new courses in collaboration with the faculties. The IIS has more than 15 years' experience in interdisciplinary education and continuously develops substantive education innovations with an interdisciplinary character. The institute identifies new themes and issues linked to current developments in academia and society.

### Amsterdam Brain and Cognition (ABC)

The *Amsterdam Brain and Cognition* Centre (ABC) is an interdisciplinary centre that fulfils a number of functions within the University of Amsterdam. It serves as a platform and community for cognitive scientists interested in a wide range of Cognitive Science topics, ranging from perception to memory, decision-making, language and logic. ABC supports interdisciplinary research, symposia, expert meetings and organizes an annual lecture series and the ABC Summer School.

## Music Cognition Group (MCG)

**Prof. dr. Henkjan Honing**
*University of Amsterdam, NL*

*Henkjan Honing* is a professor of Music Cognition at both the Faculty of Humanities and the Faculty of Science of the University of Amsterdam (UvA). He studies what musicality is or can be and to what extent human beings share musicality with other animals. His aim is to define the cognitive and biological mechanisms that underpin musicality. In addition to a research agenda (*The Origins of Musicality*, 2018, MIT Press), Honing has published several books for the general public, including the English-language publications *Musical Cognition* and *The Evolving Animal Orchestra*. Honing's books and lectures are popular with a broad audience and are appreciated both inside and outside the scientific world.

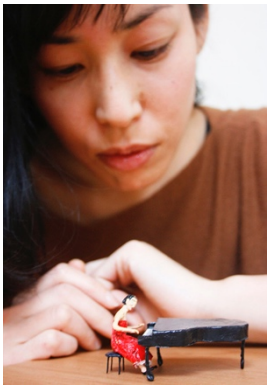
**Dr. J. Ashley Burgoyne**

*University of Amsterdam, NL*

*J. Ashley Burgoyne* is the Lecturer in Computational Musicology at the University of Amsterdam and a researcher in the Music Cognition Group at the Institute for Logic, Language, and Computation. Cross-appointed in Musicology and Artificial Intelligence, he is interested in understanding musical behavior at the audio level, using large-scale experiments and audio corpora. His McGill–Billboard corpus of time-aligned chord and structure transcriptions has served as a backbone for audio chord estimation techniques. His *Hooked on Music* project reached hundreds of thousands of participants in almost every country on Earth while collecting data to understand long-term musical memory. Currently, he is working through the Amsterdam Music Lab to understand what people are hearing – and what they are ignoring – while they stream music every day.

**Dr. Makiko Sadakata**

*University of Amsterdam, NL*



*Makiko Sadakata* is a lecturer at the musicology department of the University of Amsterdam. She is one of the core research members at Music Cognition Group (MCG) at the Institute for Logic, Language and Computation (ILLC).

What is music to our mind and how it differs from other sounds, such as language and environmental sounds? My main research focus is to address this question using various methods (mainly behavioral). I am also involved in different research projects and topics.

Keywords: sound learning, rhythm perception, background music.

## Dr. Fleur Bouwer

*University of*

*Amsterdam, NL*

*Fleur Bouwer* is researcher and lecturer on an NWO Veni grant at the Department of Psychology, working in the Brain & Cognition program group, and an associate member of MCG. With a background in cognitive neuroscience and as a musician, Fleur is interested in understanding how something seemingly simple – the acoustic sensation of listening to music – can influence the human mind in all its complexity, including our emotions, cognition, and movement, and may even benefit clinical populations. Currently, Fleur examines how the brain processes musical rhythm, and how individual differences shape our response to the beat in music.

## …And a Group of Expert Tutors

Tosca Beijaert, Bas Cornelissen, Marianne de Heer Kloots, Anna Hiemstra, Xuan Huang, Ada Örken, Andres von Schnehen, and several volunteers. See for more information:

https://www.mcg.uva.nl/summerschool/lecturers.html

## Contact us

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## Websites

https://www.mcg.uva.nl/summerschool
https://www.mcg.uva.nl/symposium

## Sponsors

UvA, Faculty of Humanities, SMART Cognitive Science (SMARTCS)
UvA, Institute for Logic, Language and Computation (ILLC)
Amsterdam Brain and Cognition (ABC)

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