

BioAcoustics Winter School

9th Ed.

January 6-17, 2025

PROVISIONAL PROGRAM

(the lectures and teaching staff may slightly change)

To apply to the *Bioacoustics Winter School*, go to:
<https://www.eneslab.com/bioacoustic-winter-school>

BWS speakers

University of Saint-Etienne (ENES Bioacoustics Research Lab)

Nicolas Mathevon, Prof (BWS organizer)
Frédéric Sèbe, Associate Researcher, Office Français de la Biodiversité
Cédric Girard-Buttoz, Researcher, CNRS
Michael Greenfield, Prof
Florence Levréro, Prof
Vincent Médoc, Associate Professor
Kasia Pisanski, Researcher, CNRS
David Reby, Prof
Jérémy Rouch, Research Engineer
ENES PhD students, post-docs

External

Olivier Adam, Prof Univ. Sorbonne
Jean-Yves Barnagaud, Associate Prof, Ecole Pratique des Hautes Etudes
Elodie Briefer, University of Copenhagen, Denmark
Caroline Casey, Associate Researcher, University of California, Santa Cruz, USA
Isabelle Charrier, Senior Researcher CNRS
Sébastien Derégnaucourt, Prof, Univ Nanterre
Paulo Fonseca, Prof, Univ. Lisbonne
Hervé Glotin, Prof, Univ Toulon
Lorène Jeantet, Post-Doc Researcher, African Institute for Mathematical Sciences, South Africa
Mirjam Knörnschild, Prof, Humboldt University Berlin (online)
Mathilde Massenet, postdoc, Lunds University, Sweden
Rafael Marquez, Senior Researcher, Museum of Natural History, Madrid, Spain
Colleen Reichmuth, Senior Researcher Univ. California, Santa Cruz, USA
Andrea Ravnigani, Prof, University of Roma
Tony Robillard, Prof, Museum National d'Histoire Naturelle, Paris
Fanny Rybak, Associate Prof, Univ. Paris-Sud
Jérôme Sueur, Prof, Museum National d'Histoire Naturelle, Paris
Simon Townsend, Prof, University of Zurich

Students should bring the following equipment:

- **laptop**
- **headphones**
- **softwares: PRAAT + Audacity + CoolEdit + R with Seewave package + Python + EXCEL + CoralSoundExplorer (<https://sound-scape-explorer.github.io/docs/CSE/>)**

Please check that you're able to record your voice with your laptop.

Location:

Faculté des Sciences & Techniques, Bât J, Amphi J108, 21 rue du Dr. Paul Michelon, 42100 Saint-Etienne.

Online talks: <https://ujmstetienne.webex.com/meet/nicolas.mathevon>

In bold: courses open to BWS students and students from the *master of Ethology (Univ.St-Etienne)*, *master of acoustics (Univ.Lyon)*, and EPHE students.

All other courses & practicals: open only to BWS students (including EPHE students).

Day 1 (Monday, January 6th, 2025)

9h30-10h30 **What is bioacoustics?** (*N.Mathevon*)

10h30-12h30 **Information in sounds – from bioacoustics to ecoacoustics**
(*F.Sebe*)

13h30-16h30 **What is a sound signal?** (*Jérémy Rouch*)
Time/frequency representations - oscillogram, spectrogram, FFT spectrum
Acoustic parameters, sound propagation, filters - Digitalization
amplitude and measuring dB
Short introduction to classical softwares (Goldwave, Avisoft, seewave) - Short practical on Audacity

16h30-17h30 **From microphones to loudspeakers** (*N.Mathevon*)
Introduction to microphones and loudspeakers

Day 2 (Tuesday, January 7th, 2025)

8h – 8h45 The International Bioacoustic Council, other structures, scientific journals and potential fundings opportunities in bioacoustics
(*N.Mathevon*)

9h-12h **Vocal communication in mammals** (*D.Reby*)

13h-14h30 **Biological sound : Physics, digitization and a focus on amplitude**
(*M. Greenfield*)

14h30-17h Signal processing (with a focus on PRAAT -*D.Reby*)
- Practicals: Introduction to PRAAT (signal manipulation -editing, resampling...) + analysis of mammal vocalizations (Frequency analysis -spectrogram, spectrum, formants...; Time analysis); Analysis and re-synthesis of human voice with PRAAT

17h-18h30 **Coding strategies in bird songs** (*N.Mathevon*)

Day 3 (Wednesday, January 8th, 2025)

8h-9h Presentation of the practicals (*M. Greenfield*)

9h15-12h15 1st half group of students: The recording and emission chains
Problems and solutions (Practicals; *M.Greenfield*)

2nd half group of students: SOUNDGEN & other R packages for sound analysis (Practicals; *M Massenet*)

14h-17pm 1st half group of students: SOUNDGEN & other R packages for sound analysis (Practicals; *M Massenet*)

2nd half group of students: The recording and emission chains
Problems and solution (Practicals; *M.Greenfield*)

Day 4 (Thursday, January 9th, 2025)

- 8h15 - 11h15 **Rhythm in acoustic communication** (*A.Ravignani*)
- 11h45-12h45 **Diversity and function of bat vocalizations** (*Mirjam Knörnschild online*)
- 13h15-15h15 **Bioacoustics as a tool for social network studies (monkeys and apes)** (*F.Levréro*)
- 15h30 - 18h30 **Understanding the acoustic world of animals from within** (*C.Reichmuth – C.Casey*)

Day 5 (Friday, January 10th, 2025)

- 8h30-12h30 **Field experimentations in bioacoustics: problems and solutions** (*I.Charrier*)
- 13h30-14h30 **Acoustic communication in frogs** (*R.Marquez*)
- 14h30-18h30 Aquatic bioacoustics: from sound to silico – *Practicals* (*P.Fonseca*)

Day 6 (Monday, January 13th, 2025)

- 8h30-12h30 Statistics for bioacoustics (*JY Barnagaud*)
- 14h-18h **Introduction to ecoacoustics** (*J.Sueur*)

Day 7 (Tuesday, January 14th, 2025)

- 8h30-11h30 **Evolution of communication in crickets** (*T. Robillard*)
- 11h30-12h30 **Language origins: an animal communication perspective** (*S.Townsend*)
- 13h-15h **Birdsong studies in the laboratory: technical advances in tracking vocal changes** (*S Derégnaucourt*)
- 15h30 – 17h **Acoustic communication in apes** (*C Girard-Buttoz*)

19h30-22h **Evening event (open to the public)**

<https://www.chanteurs-oiseaux.com/>

Jean Boucault and Johnny Rasse are two nature lovers with a passion for birds and their poetry. Imitating their songs quickly became a reflex, a game, a passion. They then sought to make their gift more musical, turning it into an art and becoming true bird singers.

Maison de l'université, 10 rue Tréfilerie, Saint-Etienne

All BWS students are welcome (no need of registration)

Day 8 (Wednesday, January 15th, 2025)

- 8h – 12 h** **Whales' bioacoustics** (*O.Adam*)
- 14h – 18h Artificial Intelligence and Bioacoustics (*H.Glotin*)

Day 9 (Thursday January 16th, 2025)

- 8-10 matin Deep learning for bioacoustics (*Lorène Jeantet*)
- 10h30-12h** Vizualization and quantification of soundscapes using *SoundScapeExplorer* software (*J.Rouch*)
- 13h-14h30** **Aquatic ecoacoustics** (*V Médoc*)
- 14h30 – 16h** **Bioacoustics as a monitoring tool for fresh waters** (*F.Rybak*)
- 16h – 18h** **Acoustic studies in Arthropods** (*F.Rybak*)

Day 10 (Friday January 17th, 2025)

- 8h – 10h30** **The vocal expression of emotions** (*E.Briefer - online*)
- 10h45 – 11h45** **Human non-verbal signals** (*Kasia Pisanski*)
- 11h45-12h15** **Applications of bioacoustics** (*F.Sèbe*)

- 14h-16h** **Final exam QCM**
