

# BioAcoustics Winter School

11<sup>th</sup> Ed.

January 4-15, 2027

## **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 (Quentin Bacquelé, Floriane Fournier, Aglaé Thieffry)

## *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

Catherine Crockford, Senior Researcher CNRS

Tudor Draganou, Associate Prof, Univ Nanterre

Paulo Fonseca, Prof, Univ. Lisbonne

Hervé Glotin, Prof, Univ Toulon

Mirjam Knörnschild, Prof, Humboldt University Berlin (online)

Rafael Marquez, Senior Researcher, Museum of Natural History, Madrid, Spain

Colleen Reichmuth, Senior Researcher Univ. California, Santa Cruz, USA

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

## **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 4<sup>th</sup>, 2027)**

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

**10h30-13h30**        **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*

**14h30-16h30**        **Information in sounds – from bioacoustics to ecoacoustics**  
(*F.Sebe*)

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

*Introduction to microphones and loudspeakers*

17h30-18h            Students' projects warm-up (*J Rouch*)

*Groups of 5 students (material: their own phones and computers + free apps)*

TOPIC: *The Lombard Effect*

*Students' expected production: 1 Poster: Scientific context, problematic, hypothesis, method, results, discussion.*

**Day 2 (Tuesday, January 5<sup>th</sup>, 2027)**

8h – 8h45            The International Bioacoustics 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-18h**            **Coding strategies in bird songs** (*N.Mathevon*)

**Day 3 (Wednesday, January 6<sup>th</sup>, 2027)**

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

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

2<sup>nd</sup> half group of students: Sound analysis and Synthesis (Practicals;  
*Q Bacquelé,*)

- 14h-17h                    1<sup>st</sup> half group of students: Sound analysis and Synthesis (Practicals;  
Q *Bacquélé*)
- 2<sup>nd</sup> half group of students: The recording and emission chains  
Problems and solution (Practicals; *M.Greenfield*)
- 18h30 - 19h30            Understanding the acoustic world of animals from within**  
*(C.Reichmuth – C.Casey - online)*

**Day 4 (Thursday, January 7<sup>th</sup>, 2027)**

- 8h - 9h15                    Acoustic communication in apes** (*C Girard-Buttoz*)
- 9h30 -10h45                Bioacoustics as a tool for social network studies in non-human  
Primates** (*F.Levréro*)
- 11h-12h                    Emerging complexity in primate communication and brain path-  
ways** (*C. Crockford*)
- 13h30-16h                 Acoustic communication in frogs** (*R.Marquez*)

**Day 5 (Friday, January 8<sup>th</sup>, 2027)**

- 8h30-12h30                Visualization and quantification of soundscapes using *SoundScape  
Explorer* software** (*J.Rouch*)
- 9h30-10h30                Diversity and function of bat vocalizations** (*Mirjam Knörnschild -  
online*)
- 14h – 16h                    Bioacoustics as a monitoring tool for fresh waters** (*F.Rybak*)
- 16h – 18h                    Acoustic studies in Arthropods** (*F.Rybak*)

**Day 6 (Monday, January 11<sup>th</sup>, 2027)**

- 8h – 10h30                 The vocal expression of emotions** (*E.Briefer - online*)
- 10h45-12h45               Long-term research in bioacoustics: a case study in the black  
redstart** (*Tudor Draganiou - online*)
- 14h-18h                    Introduction to ecoacoustics** (*J.Sueur*)

**Day 7 (Tuesday, January 12<sup>th</sup>, 2027)**

- 8h30-11h30                Evolution of communication in crickets** (*T. Robillard*)

**12h30-15h30**      **Field experimentations in bioacoustics: problems and solutions**  
*(I.Charrier)*

**16h-18h**            **Aquatic ecoacoustics** *(V Médoc)*

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

*All BWS students are welcome (no need of registration)*

**Day 8 (Wednesday, January 13<sup>th</sup>, 2027)**

**8h – 12 h**            **Whales' bioacoustics** *(O.Adam)*

**13h30-17h30**            **Statistics for bioacoustics** *(JY Barnagaud)*

**Day 9 (Thursday January 14<sup>th</sup>, 2027)**

**8h30 – 12h30**        **Artificial Intelligence and Bioacoustics** *(H.Glotin)*

**14h-18h**            **Aquatic bioacoustics: from sound to silico – Practicals**  
*(P.Fonseca)*

**Day 10 (Friday January 15<sup>th</sup>, 2027)**

**8h30-10h**            **Insect acoustic communication: from behavior to neurophysiology** *(P.Fonseca)*

**10h45 – 11h45**        **Human non-verbal signals** *(Kasia Pisanski)*

**11h45-13h**            **Applications of bioacoustics** *(F.Sèbe)*

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

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