




## SCIENTIFIC BACKGROUND & INTERESTS

Hearing Research **Speech Perception in Noise.** 


- Cochlear implants, behavioural study design
- Speech intelligibility, adaptive procedures
- Adaptation to noise, stimuli calibration

Signal Processing **Acoustic and Audio.** 

- Multichannel audio reconstruction, acoustic echo cancellation
- Time-frequency real-time algorithm design
- Sound propagation modeling, acoustic sensing
- Distributed audio systems

Machine Learning **Speech Processing.** 

- Deep learning models for speech enhancement, noise and reverberation reduction
- Binaural sound source localization, HRTF
- Virtually supervised learning, massive regression

Others **Teaching and Committees.** 

- Student supervision, PhD examiner, jury member
- Scientific outreach
- Teaching wave propagation physics (optics, acoustics, electromagnetics)

## RESEARCH POSITIONS



Dec. 2021 – current **Postdoctoral Research Fellow**, *MRC Cognition and Brain Sciences Unit, Cambridge, UK, Research.*

- Deep Hearing Lab: Dr. Tobias Goehring
- Project: Speech Enhancement for people with cochlear implants, Fondation Pour l'Audition Fellowship
  - cochlear implant research,
  - auditory science, speech perception,
  - study design, participant recruitment,
  - multi-microphone signal processing,
  - deep learning models, virtual acoustics,
  - student supervision.

Sept. 2019 – **Postdoctoral researcher**, *Orange, Orange Labs, Cesson-Sévigné, FRANCE, Research & Development.*

- Project: Multichannel acoustic echo cancellation for ad-hoc distributed audio systems
  - low-latency Acoustic Echo Cancellation (AEC),
  - Room Impulse Responses measurements,
  - speaker localization through multilateration,
  - patent pending on real-time acoustic echo cancellation robust to acoustic path change and double-talk scenario.

Feb. 2019 – **Research Engineer**, *Inria Rennes research center, Rennes, FRANCE, Research & Development.*

- Projects: audio restoration transfer of technology
  - pop noise removal,
  - multichannel declipping,
  - DSP algorithms code conversion,
  - listening tests.

Nov. 2015 – **Ph.D. candidate specialized in acoustic & audio signal processing**, *Inria Rennes research center, Rennes, FRANCE, Research.*

- Early stage researcher
- Projects: acoustic & audio signal processing inverse problems
  - digital sound processing,
  - non-convex optimization algorithms,
  - machine learning for binaural sound source localization,
  - science popularization.
- Teaching, mentoring & evaluation
  - Teaching wave propagation physics tutorials - acoustics, electromagnetics, optics - for second year students (INSA Rennes public school of engineering delivering a postgraduate degree in engineering),
  - Mentoring undergrads students on a room acoustics project,
  - Jury member for final year students graduating as sound engineers from ESRA Bretagne school.

March 2015 **Postgraduate visiting student**, *Institute of Sound and Vibration Research*, Southampton, UK, University of Southampton.

*Measuring the adaptation to noise for enhanced speech perception in individuals with normal hearing*

- Under the supervision of Dr. Jessica J. M. Monaghan and Prof. Stefan Bleeck
- Research work on the auditory system, hearing in noise, speech intelligibility, signal processing
- Setting up listening experiments for people with normal hearing
  - noisy speech stimuli calibration,
  - statistical analysis,
  - ethical study / noise exposure validation,
  - participants recruitment.

## EDUCATION



June 2022 **Training course on hearing**, *Institut de l'Audition & Institut Pasteur*, Paris, France.

- A 3-week intensive training course on auditory science
- "Hearing: From mechanisms to restoration technologies"
- In depth lectures with topics ranging from basic auditory science to gene therapy to hearing impairments,
- Practical sessions including psychoacoustic testing, confocal microscopy...

Nov. 2015 – **Ph.D. specialized in acoustic & audio signal processing**, *Université de Rennes 1*, Rennes, FRANCE, *Research*.

Jan. 2019 *Design and evaluation of sparse models and algorithms for audio inverse problems*

- Under the supervision of Dr. Nancy Bertin & Prof. Rémi Gribonval
- Graduated in: January 2019
- Projects: acoustic & audio signal processing inverse problems
  - denoising, declipping, dereverberation,
  - structured (co)sparsity for time-frequency modeling,
  - non-convex optimization algorithms,
  - virtually supervised learning for binaural sound source localization,
  - multichannel real-time audio reconstruction.

2014 – 2015 **Master 2 Acoustics**, *Le Mans Université*, Le Mans, FRANCE, *Research, with Honours*.

- A University Master of Science under the authority of the French Ministry of Education and Research
- Graduated in: October 2015
- Specialized in: acoustics
- Project: Characterization of inhomogeneous membranes vibrations (psychoacoustic descriptors, spectrum analysis, vibration behaviour)

2012 – 2015 **Acoustics and vibrations graduate engineer**, *ENSIM - École Nationale d'Ingénieurs du Mans*, Le Mans, *Spécialité Acoustique - Vibration - Capteurs*.

- A selective Engineering School in three years under the authority of the French Ministry of Education and Research delivering a postgraduate degree in engineering
- Graduated in: October 2015
- Specialized in: vibration, acoustics, sensors
- Projects: With ONERA the French Aerospace Lab (acoustic measurements, signal processing, BEM modeling, correlation techniques)

## GRANTS & AWARDS



March 18<sup>th</sup>, **FPA Research Fellowship**, *Fondation pour L'Audition*, 13, rue Moreau, Paris.

- 2021 ○ "RECOVER-CI: REverberation COmpensation using Virtual acoustics and multichannel speech Enhancement to Restore speech perception in noise with Cochlear Implants"
- Research fellowship starting 08-12-2021 (24 months, University of Cambridge, UK),
  - Award amount: € 118 126

June 28<sup>th</sup>, **Best flash presentation and poster**, *JJCAAS, Journées Jeunes Chercheurs en Audition, Acoustique musicale et Signal Audio*, Le Mans, Laboratoire d'Acoustique de l'Université du Mans.

- "Désaturation audio multicanale : une approche par coparcimonie structurée"
- Multichannel Audio Declipping : a structured cosparsity approach,
- French Young Researcher Days on Hearing, Musical Acoustics and Audio Signal Processing

March 2015 **Erasmus+ Grant**.


- European Union Mobility Grant accorded for a postgraduate visiting student stay at Institute of Sound and Vibration Research, Southampton, UK

March 2015 **Envoleo Grant**, *Région Pays de la Loire*, France.

- Regional Council Mobility Grant accorded for a postgraduate visiting student stay at Institute of Sound and Vibration Research, Southampton, UK



- 2017 – **Occasional Reviewer.**  
 present ○ International Journals  
 - IEEE Journal of Selected Topics in Signal Processing,  
 - IEEE Transactions on Audio, Speech, and Language Processing,  
 - Elsevier Signal Processing,  
 ○ International Conferences  
 - IEEE International Conference on Acoustics, Speech, and Signal Processing,  
 - International Conference on Latent Variable Analysis and Signal Separation.

- 2016 – **Scientific Outreach.**  
 present ○ Ci-Fi  experience (2022)  
 - Science popularization web page/app and demo about cochlear implants,  
 - Cambridge Science Festival,  
 - <https://deephearinglab.mrc-cbu.cam.ac.uk/ci-fi/>  
 ○ Journée Science et Musique  
 - Member of the organizing committee (2016 – 2019),  
 - Financial manager, communication manager,  
 - JSM (Journée Science et Musique) is a science popularization open day about science and music organized every year by the PANAMA team (IRISA research center, Rennes (France)),  
 - More than 650 attendees.

## TEACHING &amp; COMMITTEES



- 2022 **PhD reviewer**, *University of Cambridge*, Cambridge, UK.  
 ○ Internal reviewer/examiner along with Prof. Olivier Macherey (external reviewer),  
 ○ PhD thesis: “The Panoramic ECAP Method: estimating patient-specific patterns of current spread and neural health in cochlear-implant users”  
 ○ Dr. Charlotte Garcia
- 2022 **Student supervision**, *University of Cambridge*, Cambridge, UK.  
 ○ Project: “Speech enhancement for hearing devices: learned sound representations versus deterministic transforms”  
 ○ Student research project supervision, (Mr. Zephyr Verwimp)  
 ○ Cambridge Centre For Mathematical Sciences, math placement program.
- Oct. 2018 – **Teaching wave propagation physics**, *INSA Rennes*, Rennes, France.  
 June 2020 ○ Teaching wave propagation physics tutorials - acoustics, electromagnetics, optics - for second year students (INSA Rennes public school of engineering delivering a postgraduate degree in engineering)  
 June 2019 **Jury Member**, *ESRA Bretagne*, Rennes, France.  
 ○ Jury member for final year students graduating as sound engineers from ESRA Bretagne school,  
 ○ Report reviewer and defence jury.
- Jan. 2016 – **Mentoring undergraduate students**, *Lycée Joliot-Curie*, Rennes, France.  
 July 2016 ○ Room acoustics project, modal theory modeling, reverberation, practical validation and measurements,  
 ○ Undergraduate students in preparatory class studying intensive math, physics and engineering before French schools of Engineering competitive exams

## PUBLICATIONS &amp; SCIENTIFIC COMMUNICATIONS



## International Peer Reviewed Articles

- C. Gaultier**, A. Guérin, G. Pallone, and M. Emerit, “Double-talk robust acoustic echo cancellation using partition block frequency-domain adaptive filtering,” in *29th European Signal Processing Conference (EUSIPCO)*. IEEE, 2021, pp. 171–175.
- C. Gaultier**, S. Kitić, R. Gribonval, and N. Bertin, “Sparsity-based audio declipping methods: selected overview, new algorithms, and large-scale evaluation,” *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 29, pp. 1174–1187, 2021.
- S. Kitić, **C. Gaultier**, and G. Pallone, “A comparative study of multilateration methods for single-source localization in distributed audio,” in *Conference of Open Innovations Association, FRUCT*, no. 27. FRUCT Oy, 2020, pp. 328–336.
- R. Lebarbenchon, E. Camberlein, D. Di Carlo, **C. Gaultier**, A. Deleforge, and N. Bertin, “Evaluation of an open-source implementation of the SRP-PHAT algorithm within the 2018 locata challenge,” in *2018 16th International Workshop on Acoustic Signal Enhancement (IWAENC), LOCATA Challenge*. IEEE, 2018.
- C. Gaultier**, N. Bertin, and R. Gribonval, “CASCADE: Channel-Aware Structured CosparsE Audio DEclipper,” in *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, 2018, pp. 571–575.
- C. Gaultier**, S. Kitić, N. Bertin, and R. Gribonval, “AUDASCITY: Audio Denoising by Adaptive Social CosparsITY,” in *2017 25th European Signal Processing Conference (EUSIPCO)*. IEEE, 2017, pp. 1265–1269.

C. Gaultier, S. Kataria, and A. Deleforge, "VAST: The Virtual Acoustic Space Traveler dataset," in *International Conference on Latent Variable Analysis and Signal Separation*. Springer, 2017, pp. 68–79.

S. Kataria, C. Gaultier, and A. Deleforge, "Hearing in a shoe-box: binaural source position and wall absorption estimation using virtually supervised learning," in *2017 IEEE International Conference on Acoustics, Speech and Signal Processing*. IEEE, 2017, pp. 226–230.

## Workshops with Selecting Committee

C. Gaultier and T. Goehring, "Deep learning strategies for compensation of noise and reverberation: single- vs multi-microphone approaches and applications to cochlear implants," in *Hearing, Audio and Audiology Sciences Meeting*, Spetember, 12 2022.

C. Gaultier, N. Bertin, and R. Gribonval, "Désaturation audio multicanale : une approche par coparcimonie structurée," in *JJCAAS, Journées Jeunes Chercheurs en Audition, Acoustique musicale et Signal audio*, 2019.

C. Gaultier, N. Bertin, and R. Gribonval, "Multichannel cosparsé declipping: Structure helps," in *GDR MIA, Journée Thématique "Parcimonie et Applications"*, 2018.

C. Gaultier, S. Kitić, N. Bertin, and R. Gribonval, "Cosparsé denoising: The importance of being social," in *The Signal Processing with Adaptive Sparse Structured Representations (SPARS) workshop*, 2017.

R. Gokula, C. Gaultier, J. J. M. Monaghan, and S. Bleeck, "Acclimatization to different english accents for enhanced speech intelligibility in noise in individuals with normal hearing," in *Basic Auditory Science Meeting*. British Society of Audiology, 2015.

## Research Reports

C. Gaultier, N. Bertin, S. Kitić, and R. Gribonval, "A modeling and algorithmic framework for (non) social (co) sparse audio restoration," 2017.

## Thesis

C. Gaultier, "Design and evaluation of sparse models and algorithms for audio inverse problems," Ph.D. dissertation, Université de Rennes 1, Jan. 2019.

## Talks

C. Gaultier, "Double-talk robust acoustic echo cancellation using partition block frequency-domain adaptive filtering," in *29th European Signal Processing Conference (EUSIPCO)*, August, 26 2021.

C. Gaultier, "A double-talk robust frequency-domain acoustic echo cancellation algorithm," in *Orange Labs Seminar, Rennes*, February, 9 2021.

C. Gaultier, "Design and evaluation of sparse models and algorithms for audio inverse problems," in *Orange Labs Seminar, Rennes*, October, 10 2019.

C. Gaultier, "Désaturation audio multicanale : une approche par coparcimonie structurée," in *JJCAAS, Journées Jeunes Chercheurs en Audition, Acoustique musicale et Signal audio*, June, 27 2019.

C. Gaultier, "Multichannel cosparsé declipping: Structure helps," in *GDR MIA, Journée Thématique "Parcimonie et Applications"*, May, 03 2018.

C. Gaultier, "Cosparsé denoising: The importance of being social," in *The Signal Processing with Adaptive Sparse Structured Representations (SPARS) workshop*, June, 05 2017.

C. Gaultier, "VAST: The Virtual Acoustic Space Traveler dataset," in *International Conference on Latent Variable Analysis and Signal Separation*, February, 21 2017.

## COMPUTER SKILLS



Program- ming	python, C++, bash, distributed computing (OAR, Slurm), Docker, PyTorch	Scientific softwares	MatLab, Labview, COMSOL, LMS VirtualLab, LMS TestLab
Operating Systems	macOS, Linux, Windows	Office softwares	Microsoft Suite, LibreOffice Suite, L <sup>A</sup> T <sub>E</sub> X
Computer Assisted Design	SolidWorks, Catia	Web	Html, CSS, WordPress, Jekyll

## LANGUAGES



English	Fluent <input type="radio"/> Obtained from doing numerous trips in English-speaking countries (England, Wales, Malta, Canada) <input type="radio"/> Scored 945 out of 990 and 900 out of 990 points on TOEIC certification in 2012 and 2014		
French	Native language	Spanish	Basic knowledge