ANTOINE DELEFORGE

PERSONAL INFORMATION

Born in Caen (France), on September the 29th, 1988

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RESEARCH INTERESTS

Audio signal processing, Acoustics, Machine learning, Statistics, Robot audition.

WORK EXPERIENCE

Tenured Researcher — *2016 - ...* — INRIA, France

Description : Permanent research position at the public research institute Inria, first in Rennes (01/2016-04/2018) in the team PANAMA, then in Nancy (04/2018 -) in the team MULTISPEECH.
Action: Research program in machine learning for audio signal processing, PhD and master students supervision, bachelor- and master-level teaching.

Post-Doc — *2014-2015* — FAU, Erlangen, Allemagne

Description : Post-doc at the Erlangen-Nuremberg university with Prof. Walter Kellermann.
Action: Audio processing for robotics within the European project *Embedded Audition for RobotS* EARS (2014-2017). Supervision of 12 Students (Bachelor to Master level). Teaching assistant for the master course "statistical signal processing" (12 hours teaching, exam writing, evaluation).

Research Visit — *Apr. 2013* — Institut Technion, Haifa, Israel

Description : One month collaborative invitation at the electrical engineering department of the Technion Institute by Prof. Yoav Schechner.
Action : Development of new binaural multiple-source localization methods, leading to a journal publication. Co-supervision of a master student.

Teaching — *2010-2013* — Teaching at ESISAR, Valence, France

Description : 204 hours of teaching in the engineering school ESISAR, bachelor to master level.
Courses: Preparation, supervision and evaluation of tutorials and classes on object oriented programming, JAVA, databases, cryptography and graph theory.

AWARDS AND DISTINCTIONS

Paper Award — *May 2016* — Award for Outstanding Contributions in Neural Systems

The paper *"Acoustic Space Learning for Sound-source Separation and Localization on Binaural Manifolds"* [IJNS'15] published in the International Journal of Neural Systems received the 2016 Hojjat Adeli Award for Outstanding Contributions in Neural Systems.

Paper Award — *Sep. 2015* — Best Student paper award at the conference ICIP 2015

The paper *"Head Pose Estimation via High-Dimensional Regression"* [ICIP'15] received the best student paper award at the IEEE International Conference on Image Processing.

Thesis Award — *Jun. 2014* — Thesis Prize in Image, Signal and Vision

Winner of the GRETSI-EEA-ISIS French thesis prize in *"Image, Signal, Vision"* in 2014.

EDUCATION

PhD *2010-2013* INRIA, Grenoble, France

Result : PhD obtained with honors.
Location : Inria (National Research Institute in Automatic and Informatics).
Title: Acoustic Space Mapping: a Machine Learning Approach to Sound Source Separation and Localization.
Topics: Machine Learning, Audio Signal Processing, Statistics, Source Separation and Localization, Binaural Hearing, Robotics.
Supervisor: Radu Horaud.

Research MSc *2008-2010* Université Joseph Fourier, Grenoble, France

Result: 15.5/20, ranked 1st/22, diploma obtained with honors
Description: Master of Science in Informatics at Grenoble, specialty *Graphics, Vision, Robotics*.
Title: A Sensori-motor Learning Approach to Sound Source Localization.

Engineering MSc *2007-2010* Ensimag, Grenoble, France

Result: 15.0/20, diploma obtained with honors
Description: Engineer in Informatics and Applied Mathematics (Algorithms, Software, Programming, Numerical Methods, Statistics...).

INVITED TALKS

ISWS 2021 Invited speaker (30 minutes) at the 2021 Intelligent Sensing Winter School organized by the Queen Mary University of London (remote).

S3P 2020 Invited speaker (60 minutes) at the IEEE summer school "Signal Processing for Autonomous System", Arenzano, Italy.

ESI Workshop 2017 Invited speaker (30 minutes) at the workshop "Systematic approaches to deep learning methods for audio", Erwin Schroedinger Institute, Vienna, Austria.

LVA/ICA 2015 Invited speaker (90 minutes) at the LVA/ICA 2015 Summer School. Joint tutorial on "Bayesian Learning in Signal Processing" with Mikkel N. Schmidt on August the 24th, 2015 in Liberec (Czech Republic).

GRETSI 2015 Invited speaker (30 minutes) at the French biennial signal processing conference GRETSI 2017 in Lyon after receiving the GRETSI-EEA-ISIS thesis price.

OTHER RESEARCH AND TECHNOLOGICAL ACTIVITIES

Grants I was awarded fundings as the **principal investigator** (PI) of National Research Agency project (DENISE, 2021-2024, 250k€), as the **local coordinator** of a National Research Agency project (HAIKUS, 2019-2023, 110k€), as the **PI** of an Inria *Exploratory Action* program (ACOUST.IA, 2020-2023, 100k€) and as the **PI** an Inria *Technological Development Aid* program (PEGASUS, 2020-2022, 180k€).

Responsibilities Co-organizer of 5 special sessions on various aspects of learning-based audio and acoustic signal processing at the international conferences ICASSP (2016, 2018), LVA/ICA (2017,2018) and Quiet Drones (2020). Main organizer of a wide-audience ($\sim$ 600 people) one-day science event in Rennes (2016, 2017). Elected member of the IEEE technical committee for Audio, Acoustics and Signal Processing (2018-). Main organizer of the IEEE Signal Processing Cup (2019). Associate editor for the EURASIP journal JASM (2022-).

Reviews Regular reviewer for top journals and conferences in **audio** (IEEE T-ASLP, IEEE ICASSP, etc.), **signal processing** (IEEE J-STSP, IEEE T-SP, Elsevier SigPro, etc.), **robotics** (Springer RAS, IEEE IROS, etc.) and **machine learning** (NeurIPS, ICML, MLSP, etc.).

Dissemination Author of three Matlab toolboxes and four datasets for research reproducibility (see website).

LIST OF INTERNATIONAL JOURNAL AND BOOK CHAPTER PUBLICATIONS

SPL'22 Sprunck T., **Deleforge A.**, Privat Y., Foy C. (2022). "Gridless 3D Recovery of Image Sources from Room Impulse Responses". *IEEE Signal Processing Letters*, 29, 2427-2431.

JASM'21 Di Carlo D. et al. (2021). "dEchorate: a calibrated room impulse response dataset for echo-aware signal processing". *EURASIP Journal on Audio, Speech, and Music Processing* 1-15.

JASA'21 Foy C., **Deleforge A.** and Di Carlo D. (2021). "Mean absorption estimation from room impulse responses using virtually supervised learning". *The Journal of the Acoustical Society of America* 150 (2), 1286-1299.

SPMag'19 **Deleforge A.**, Di Carlo D., Strauss M., Serizel R. and Marcenaro L. (2019). "Audio-Based Search and Rescue With a Drone: Highlights From the IEEE Signal Processing Cup 2019 Student Competition". *IEEE Signal Processing Magazine* 36, no. 5.

Chapter'19 **Deleforge A.**, Schmidt A. and Kellermann W. (2019). "Audio-motor integration for robot audition". *Multimodal Behavior Analysis in the Wild*. Academic Press.

TASLP'18 Zheng C., **Deleforge A.**, Li X. and Kellermann W. (2018). "Statistical Analysis of the Multichannel Wiener Filter Using a Bivariate Normal Distribution for Sample Covariance Matrices". *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 26(5), 951-966.

JMVA'17 Perthame, E., Forbes, F. and **Deleforge, A.** (2018). "Inverse regression approach to robust nonlinear high-to-low dimensional mapping". *Elsevier Journal of Multivariate Analysis*, 163, 1-14.

TIP'17 Drouard, V., Horaud, R., **Deleforge, A.**, Ba, S., and Evangelidis, G. (2017). "Robust Head-Pose Estimation Based on Partially-Latent Mixture of Linear Regressions". *IEEE Transaction on Image Processing*, 26(3), 1428-1440.

JSTSP'15 **Deleforge, A.**, Forbes, F., Ba, S. and Horaud, R. (2015). "Hyper-Spectral Image Analysis With Partially Latent Regression and Spatial Markov Dependencies". *IEEE Journal of Selected Topics in Signal Processing*, 9(6), 1037-1048.

TASLP'15 **Deleforge, A.**, Horaud, R., Schechner, Y. Y. and Girin, L. (2015). "Co-localization of audio sources in images using binaural features and locally-linear regression". *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 23(4), 718-731.

StatCo'15 **Deleforge, A.**, Forbes, F. and Horaud, R. (2015). "High-dimensional regression with gaussian mixtures and partially-latent response variables". *Springer Statistics and Computing*, 25(5), 893-911

IJNS'15 **Deleforge, A.**, Forbes, F. and Horaud, R. (2015). "Acoustic space learning for sound-source separation and localization on binaural manifolds". *World Scientific International journal of neural systems*, 25(01), 1440003.

JMUI'13 Alameda-Pineda, X., Sanchez-Riera, J., Wienke, J., Franc, V., Čech, J., Kulkarni, K., **Deleforge, A.** and Horaud, R. (2013). "RAVEL: An annotated corpus for training robots with audiovisual abilities". *Journal on Multimodal User Interfaces*, 7(1-2), 79-91.

LIST OF INTERNATIONAL CONFERENCE PUBLICATIONS

EUSIPCO'23 Bahrman L., Krémé M., Magron P., **Deleforge A.** (2023). "Signal inpainting from Fourier magnitudes". In *2023 31th European Signal Processing Conference (EUSIPCO)*. EURASIP.

Interspeech'23 Srivastava P., **Deleforge A.**, Politis, A., Vincent E. (2022). "How to (Virtually) Train Your Speaker Localizer". In *21st Annual Conference of the International Speech Communication Association (Interspeech) 2020*.

IWAENC'22 Srivastava P., **Deleforge A.**, Vincent E. (2022). "Realistic sources, receivers and walls improve the generalisability of virtually-supervised blind acoustic parameter estimators". In *2022 International Workshop on Acoustic Signal Enhancement (IWAENC)*, (pp. 867-871). IEEE.

EUSIPCO'22 Dilungana S., **Deleforge A.**, Foy C., and Faisan S. (2022). "Geometry-informed estimation of surface absorption profiles from room impulse responses". In *2022 30th European Signal Processing Conference (EUSIPCO)*, (pp. 867-871). EURASIP.

WASPAA'21 Srivastava P., **Deleforge A.**, Vincent E. (2021). "Blind room parameter estimation using multiple multichannel speech recordings". In *2021 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*. IEEE.

DCASE'21 Politis A. et al. (2021). "A dataset of dynamic reverberant sound scenes with directional interferers for sound event localization and detection". In *2021 Workshop on Detection and Classification of Acoustic Scenes and Events (DCASE)*.

ICASSP'21 Saqib, U., **Deleforge, A.**, Jensen, J.R. (2021). "Detecting acoustic reflectors using a robot's ego-noise". In *2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

Interspeech'20 Pariente, M. et al. "Asteroid: the PyTorch-based audio source separation toolkit for researchers". In *21st Annual Conference of the International Speech Communication Association (Interspeech) 2020*.

ICASSP'20b Pariente, M., Cornell, S., **Deleforge, A.**, Vincent, E. (2020). "Filterbank design for end-to-end speech separation". In *2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

ICASSP'20a Di Carlo, D., Elvira, C., **Deleforge, A.**, Bertin, N., Gribonval, R. (2020). "BLASTER: An Off-Grid Method for Blind and Regularized Acoustic Echoes Retrieval". In *2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

Interspeech'19 Pariente, M., **Deleforge, A.**, Vincent, E. (2019). "A Statistically Principled and Computationally Efficient Approach to Speech Enhancement using Variational Autoencoders". In *20th Annual Conference of the International Speech Communication Association (Interspeech) 2019*.

ICASSP'19 Di Carlo, D., **Deleforge, A.**, Bertin, N. (2019). "Mirage: 2D Source Localization Using Microphone Pair Augmentation with Echoes". In *2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

NIPS'18 Peic-Tukuljac, H., **Deleforge, A.** and Gribonval, R (2018). "MULAN: A Blind and Off-Grid Method for Multichannel Echo Retrieval". *Submitted* to *2018 International Conference on Neural Information Processing (NIPS)*.

IROS'18 Strauss, M., Mordel, P., Miguet, V. and **Deleforge, A.** (2018). "DREGON: Dataset and Methods for UAV-embedded Sound Source Localization". *Accepted* in *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*.

ICASSP'18c Liutkus, A., Rohlfing, C. and **Deleforge, A.** (2018, April). "Audio source separation with magnitude priors: the BEADS model". In *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

ICASSP'18b Scheibler, R., Di Carlo, D., **Deleforge, A.** and Dokmanić, I. (2018, April). "Separake: Source Separation with a Little Help From Echoes". In *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

ICASSP'18a Keriven, N., **Deleforge, A.** and Liutkus, A. (2018, April). "Blind Source Separation Using Mixtures of Alpha-Stable Distributions". In *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE.

ICASSP'17c Drémeau, A. and **Deleforge, A.** (2017, March). "Phase retrieval with a multivariate Von Mises prior: From a Bayesian formulation to a lifting solution". In *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, (pp. 4596-4600). IEEE.

ICASSP'17b Kataria, S., Gaultier, C. and **Deleforge, A.** (2017, March). "Hearing in a shoe-box: Binaural source position and wall absoprtion estimation using virtually supervised learning". In *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, (pp. 226-230). IEEE.

ICASSP'17a **Deleforge, A.** and Traonmilin, Y. (2017, March). "Phase unmixing : Multichannel source separation with magnitude constraints". In *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, (pp. 161-165). IEEE.

LVAICA'17 Gaultier, C., Kataria, S. and **Deleforge, A.** (2017, February). "VAST : The virtual acoustic space traveler dataset". In *International Conference on Latent Variable Analysis and Signal Separation. Accepted*. Springer Berlin Heidelberg.

IROS'16 Schmidt, A., **Deleforge, A.** and Kellermann, W. (2016, October). "Ego-Noise Reduction Using a Motor

Data-Guided Multichannel Dictionary". In *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*.

EUSIPCO'16 **Deleforge, A.** and Forbes, F. (2016, August). "Robust binaural ratio: a complex t-distributed feature for robust sound localization". In *2016 24th European Signal Processing Conference (EUSIPCO)*, (pp. 419-423). EURASIP.

ICIP'15 Drouard, V., Ba, S., Evangelidis, G., **Deleforge, A.** and Horaud, R. (2015, September). "Head pose estimation via probabilistic high-dimensional regression". In *2015 IEEE International Conference on Image Processing (ICIP)*, (pp. 4624-4628). IEEE.

EUSIPCO'15 **Deleforge, A.**, Gannot, S. and Kellermann, W. (2015, August). "Towards a generalization of relative transfer functions to more than one source". In *2015 23rd European Signal Processing Conference (EUSIPCO)*, (pp. 419-423). IEEE.

ICASSP'15 **Deleforge, A.** and Kellermann, W. (2015, April). "Phase-optimized K-SVD for signal extraction from underdetermined multichannel sparse mixtures". In *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (pp. 355-359). IEEE.

ITG'14 Loellmann, H. W., Barfuss, H., **Deleforge, A.**, Meier, S. and Kellermann, W. (2014, September). "Challenges in acoustic signal enhancement for human-robot communication". In *Speech Communication; 11. ITG Symposium*; Proceedings of (pp. 1-4). VDE.

EUSIPCO'14b **Deleforge, A.**, Forbes, F. and Horaud, R. (2014, September). "Hyper-spectral image analysis with partially-latent regression". In *2014 22nd European Signal Processing Conference (EUSIPCO)* (pp. 1572-1576). IEEE.

EUSIPCO'14a **Deleforge, A.**, Drouard, V., Girin, L. and Horaud, R. (2014, September). "Mapping sounds onto images using binaural spectrograms". In *2014 22nd European Signal Processing Conference (EUSIPCO)* (pp. 2470-2474). IEEE.

HUMANOIDS'13 Cech, J., Mittal, R., **Deleforge, A.**, Sanchez-Riera, J., Alameda-Pineda, X. and Horaud, R. (2013, October). "Active-speaker detection and localization with microphones and cameras embedded into a robotic head". In *2013 13th IEEE-RAS International Conference on Humanoid Robots (Humanoids)* (pp. 203-210). IEEE.

ICASSP'13 **Deleforge, A.**, Forbes, F. and Horaud, R. (2013, May). "Variational EM for binaural sound-source separation and localization". In *2013 IEEE International Conference on Acoustics, Speech and Signal Processing* (pp. 76-80). IEEE.

HUMANOIDS'12 Sanchez-Riera, J., Alameda-Pineda, X., Wienke, J., **Deleforge, A.**, Arias, S., Čech, J., Wrede, S. and Horaud, R. (2012, November). "Online multimodal speaker detection for humanoid robots". In *2012 12th IEEE-RAS International Conference on Humanoid Robots (Humanoids 2012)* (pp. 126-133). IEEE.

MLSP'12 **Deleforge, A.** and Horaud, R. (2012, September). "2D sound-source localization on the binaural manifold". In *2012 IEEE International Workshop on Machine Learning for Signal Processing* (pp. 1-6). IEEE.

LVAICA'12 **Deleforge, A.** and Horaud, R. (2012, March). "A latently constrained mixture model for audio source separation and localization". In *International Conference on Latent Variable Analysis and Signal Separation* (pp. 372-379). Springer Berlin Heidelberg.

HRI'12 **Deleforge, A.** and Horaud, R. (2012, March). "The cocktail party robot: Sound source separation and localisation with an active binaural head". In *Proceedings of the seventh annual ACM/IEEE international conference on Human-Robot Interaction* (pp. 431-438). ACM.