

# Joaquim Campos



## Personal data

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Location: Lisbon, Portugal

Links: [Website](#) | [Email](#) | [Google Scholar](#) | [Linkedin](#) | [Github](#)

## In Brief

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I am an engineer and researcher specializing in signal processing and artificial intelligence, as well as a Python developer. In academia, my focus has been on deep learning, learning theory, image and video compression, and inverse problems. Additionally, I am Co-Founder of Radiobooks, a startup that assists independent authors and self-learners in automatically converting their books into audio-books using AI. Through this venture, I have gained knowledge in product development and Python DevOps.

### Highlights:

- [7 publications](#) with over 300 citations in top-tier venues, and 3 patents.
- Contributed to the development of [pioneering methods](#) in neural compression.
- Crafted [novel algorithms](#) for learning the activation functions of a neural network.
- Created the "Deep Splines" PyTorch package.
- Co-Founded [Radiobooks](#)—a startup that makes AI text-to-speech technology.
- Built the [back-end](#) of a complex text-to-speech app.

*Please note that I will be attending a course in philosophy and meditation at the Tergar Institute in Nepal between mid-September and mid-December in both 2024 and 2025.*

## Education

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Present Sep 2023	<p>Course in Philosophy and Meditation <a href="#">Tergar Institute</a>, Kathmandu, Nepal</p> <p>Head Teacher: Mingyur Rinpoche. Project: <a href="#">Communicating Emptiness</a>. <i>The course will continue on-site between mid-September and mid-December 2024.</i></p>
Feb 2020 Sep 2016	<p>MSc in Communication Systems <a href="#">EPFL</a> (École Polytechnique Fédérale de Lausanne), Lausanne, Switzerland</p> <p>School: <a href="#">School of Computer and Communication Sciences</a>. Specialization: signal processing and artificial intelligence. Master's thesis: <a href="#">Higher-Order Regularization Methods for Supervised Learning</a>. Grade: 5.67/6.00 — Ranking: 2nd/31.</p>
Jul 2016 Sep 2013	<p>BSc in Electrical and Computer Engineering <a href="#">Universidade de Lisboa</a>, Lisbon, Portugal</p> <p>School: <a href="#">Instituto Superior Técnico</a>. Grade: 16.4/20.00.</p>

## Work experience

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Aug 2022 Jan 2024	<b>Co-Founder and CTO</b> <a href="#">Radiobooks</a> , Lisbon, Portugal
	Subject: Converting books into audiobooks automatically using Artificial Intelligence. <ul style="list-style-type: none"><li>• Designed and built an app for revising AI-generated audio.</li><li>• Tech stack: Python, FastAPI, MongoDB, Pytest, Docker, GitHub Actions, Codecov, Fly.io, AWS S3, and Better Stack.</li></ul>
Sep 2021 Apr 2020	<b>Research and Teaching Assistant</b> <a href="#">Biomedical Imaging Group</a> , EPFL, Lausanne, Switzerland
	Subject: Supervised Learning with Sparsity-Promoting Regularization. <ul style="list-style-type: none"><li>• Developed a novel framework to learn the activation functions of a neural network;</li><li>• Designed a spline-based supervised learning method which constructs piecewise-linear models with few regions (sparse).</li></ul>
Aug 2018 Mar 2019	<b>Research Intern</b> <a href="#">Disney Research Studios</a> , Zurich, Switzerland
	Subject: Image and Video Compression using Deep Learning. <ul style="list-style-type: none"><li>• Developed the first content-adaptive neural image compression scheme;</li><li>• Aided in the construction of a state-of-the-art neural video compression framework.</li></ul>

## Teaching experience

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Sep 2021 Apr 2020	<b>Teaching Assistant in the Courses Signals and Systems I &amp; II</b> <a href="#">EPFL</a> (École Polytechnique Fédérale de Lausanne), Lausanne, Switzerland
	Taught by Prof. Michael Unser to the Life Sciences and Microengineering sections.
Sep 2021 Apr 2020	<b>Supervision of Master Semester Projects</b> <a href="#">EPFL</a> (École Polytechnique Fédérale de Lausanne), Lausanne, Switzerland
	Co-supervisor of two Master semester projects on <a href="#">lipschitz-constrained GANs</a> .

## Skills

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Expertise:	Theoretical and practical aspects of machine learning, deep learning, and signal processing; Python development.
DevOps:	Python, C, FastAPI, Pytest, PyTorch, CI/CD, Bash, Linux, MongoDB, Docker, Github Actions, Codecov, AWS, Fly.io, Better Stack
Languages:	Portuguese, English (professional), Spanish (advanced), French (conversational).

## Volunteering

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- In 2022, I spent one month teaching at [Sammema school](#) in Arusha, Tanzania, to spend one month teaching at a local school. During my time there, I taught science, English, and mathematics to elementary and middle school students.
- Since 2021, I have been volunteering with [CASA](#) whenever I am in Lisbon. The goal of this organization is to help alleviate the suffering of people experiencing homelessness.

The publications can be consulted [here](#).

## Publications: Science

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- [1] A. Goujon, J. Campos, and M. Unser, “Stable parameterization of continuous and piecewise-linear functions,” *Applied and Computational Harmonic Analysis*, vol. 67, p. 101581, Nov. 2023.
- [2] S. Aziznejad, J. Campos, and M. Unser, “Measuring Complexity of Learning Schemes Using Hessian-Schatten Total Variation,” *SIAM Journal on Mathematics of Data Science*, vol. 5, no. 2, pp. 422–445, Jun. 2023.
- [3] J. Campos, S. Aziznejad, and M. Unser, “Learning of Continuous and Piecewise-Linear Functions With Hessian Total-Variation Regularization,” *IEEE Open Journal of Signal Processing*, vol. 3, pp. 36–48, Dec. 2021.
- [4] P. Bohra, J. Campos, H. Gupta, S. Aziznejad, and M. Unser, “Learning Activation Functions in Deep (Spline) Neural Networks,” *IEEE Open Journal of Signal Processing*, vol. 1, pp. 295–309, Nov. 2020.
- [5] S. Aziznejad, H. Gupta, J. Campos, and M. Unser, “Deep Neural Networks With Trainable Activations and Controlled Lipschitz Constant,” *IEEE Transactions on Signal Processing*, vol. 68, pp. 4688–4699, Aug. 2020.
- [6] A. Djelouah, J. Campos, S. Schaub-Meyer, and C. Schroers, “Neural Inter-Frame Compression for Video Coding,” in *Proceedings of the 2019 IEEE/CVF International Conference on Computer Vision (ICCV)*, Oct. 2019.
- [7] J. Campos, S. Meierhans, A. Djelouah, and C. Schroers, “Content Adaptive Optimization for Neural Image Compression,” in *Proceedings of the 2019 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, Jun. 2019.

## Publications: Philosophy

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- [1] J. Campos, “Mahayana Buddhist Ethics: Deontological, Virtue-Based or Consequentialist? An Optimization Theory Perspective,” Work-in-Progress.
- [2] J. Campos, “On the Wrongness of Killing Non-Human Animals,” Course Thesis, École Polytechnique Fédérale de Lausanne, May 2018.

## Patents

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- [1] C. Schroers, S. Meierhans, J. Campos, J. Mcphillen, A. Djelouah, E. Varis Doggett, S. Labrozzi, and Y. Xue, “Content Adaptive Optimization for Neural Data Compression,” US Patent 11,057,634, Nov., 2020.
- [2] C. Schroers, J. Campos, A. Djelouah, Y. Xue, E. Varis Doggett, J. Mcphillen, and S. Labrozzi, “Systems and Methods for Reconstructing Frames,” US Patent 10,972,749, Mar., 2021.
- [3] C. Schroers, J. Campos, A. Djelouah, Y. Xue, E. Varis Doggett, J. Mcphillen, and S. Labrozzi, “Systems and Methods for Generating a Latent Space Residual,” US Patent 11,012,718, Mar., 2021.