



# JOAQUIM CAMPOS

## PERSONAL DATA

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PLACE AND DATE OF BIRTH: LISBON, PORTUGAL, ON 10 FEBRUARY 1996  
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## WORK EXPERIENCE

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| PRESENT<br>2022 AUG  | CO-FOUNDER AND CTO AT <a href="#">RADIOBOOKS</a> .<br><i>Converting books into audiobooks automatically using Artificial Intelligence</i> <ul style="list-style-type: none"><li>DESIGNED AND CREATED AN APP FOR REVISING AI-GENERATED AUDIO (LAUNCH: MAY 2023).</li></ul>   |
| 2021 SEP<br>2020 APR | RESEARCH ASSISTANT<br>TOPIC: <i>Supervised Learning with Sparsity-Promoting Regularization</i><br>BIOMEDICAL IMAGING GROUP, École Polytechnique Fédérale de Lausanne, LAUSANNE, SWITZERLAND. SUPERVISOR: Prof. Michael Unser. <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> |
| 2018 AUG<br>2019 MAR | RESEARCH INTERN<br>TOPIC: <i>Image and Video Compression using Deep Learning</i><br>Disney Research, ZURICH, SWITZERLAND. SUPERVISORS: Dr. Christopher Schoers and Dr. Abdelaziz Djelouah. <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>  |

## UNIVERSITY EDUCATION

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| 2020 FEB<br>2016 SEP | <b>MSC IN Communication Systems.</b><br><b>SPECIALIZATION: Signals, Images and Interfaces.</b><br><b>École Polytechnique Fédérale de Lausanne</b> , SCHOOL OF COMPUTER SCIENCE AND COMMUNICATION SCIENCES, LAUSANNE, SWITZERLAND.<br>GRADE: <b>5.67/6.00.</b><br>FOCUS ON SIGNAL PROCESSING AND ARTIFICIAL INTELLIGENCE, AND THEIR APPLICATIONS TO IMAGING AND AUDIO. MASTER'S THESIS: <i>Higher-Order Regularization Methods for Supervised Learning</i> . BIOMEDICAL IMAGING GROUP. |
| 2016 JUL<br>2013 SEP | <b>BSC IN Electrical and Computer Engineering.</b><br><b>Universidade de Lisboa, Instituto Superior Técnico</b> , LISBON, PORTUGAL.<br>GRADE: <b>16.4/20.0</b>  |

## TEACHING EXPERIENCE

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| CURRENT<br>2020 SEP | <b>SUPERVISION OF MASTER SEMESTER PROJECTS</b><br><b>École Polytechnique Fédérale de Lausanne</b> , LAUSANNE, SWITZERLAND<br>CO-SUPERVISOR OF TWO MASTER SEMESTER PROJECTS ON "LIPSCHITZ CONSTRAINED GENERATIVE ADVERSARIAL NETWORKS". ACCESS AT <a href="http://bigwww.epfl.ch/teaching/projects/subject.html#id_2540">http://bigwww.epfl.ch/teaching/projects/subject.html#id_2540</a> .   |
| CURRENT<br>2020 SEP | <b>TEACHING ASSISTANCE IN THE COURSES MICRO-310/11: Signals and Systems I/II</b><br><b>École Polytechnique Fédérale de Lausanne</b> , LAUSANNE, SWITZERLAND<br>TAUGHT BY <b>Prof. Michael Unser</b> TO THE <i>Life Sciences</i> AND <i>Microengineering</i> SECTIONS.<br>APPROXIMATE NUMBERS PER SEMESTER: 250 STUDENTS; 65 H OF GUIDANCE OF EXERCISE SESSIONS AND INTERACTION WITH STUDENTS ON THE COURSE FORUM; 60 H OF CLASS PREPARATION; AND 40 H OF EXAM SUPERVISION AND GRADING. |

## LANGUAGES

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| MOTHER TONGUE:       | PORTUGUESE |
| PROFESSIONAL (C1):   | ENGLISH    |
| ADVANCED (B2):       | SPANISH    |
| CONVERSATIONAL (B1): | FRENCH     |

## OTHER SKILLS

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| PRIMARY TECHNICAL SKILLS: | KNOWLEDGE OF BOTH THEORETICAL AND PRACTICAL ASPECTS OF SIGNAL PROCESSING; EXPERIENCE WITH NEURAL NETWORKS. |
| PROGRAMMING:              | C, PYTHON, FASTAPI, PYTORCH, BASH, MATLAB, $\text{\LaTeX}$   |

## PUBLICATIONS: SCIENCE

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- [1] 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, 2023. ACCESS AT [HTTPS://EPUBS.SIAM.ORG/DOI/10.1137/22M147517X](https://epubs.siam.org/doi/10.1137/22M147517X)
- [2] A. GOUJON, J. CAMPOS, AND M. UNSER, “STABLE PARAMETRIZATION OF CONTINUOUS AND PIECEWISE-LINEAR FUNCTIONS,” *arXiv:2203.05261*, MAR. 2022. ACCESS AT [HTTPS://ARXIV.ORG/ABS/2203.05261](https://arxiv.org/abs/2203.05261)
- [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, JAN. 2022. ACCESS AT [HTTPS://IEEEXPLORE.IEEE.ORG/DOCUMENT/9655475](https://ieeexplore.ieee.org/document/9655475)
- [4] P. BOHRA, J. CAMPOS, H. GUPTA, S. AZIZNEJAD, AND M. UNSER, “LEARNING ACTIVATION FUNCTIONS IN DEEP (SPINE) NEURAL NETWORKS,” *IEEE Open Journal of Signal Processing*, VOL. 1, PP. 295–309, NOV. 2020. ACCESS AT [HTTPS://IEEEXPLORE.IEEE.ORG/DOCUMENT/9264754](https://ieeexplore.ieee.org/document/9264754)
- [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. ACCESS AT [HTTPS://IEEEXPLORE.IEEE.ORG/DOCUMENT/9163082](https://ieeexplore.ieee.org/document/9163082)
- [6] A. DJELOUAH, J. CAMPOS, S. SCHAUB-MEYER, AND C. SCHROERS, “NEURAL INTER-FRAME COMPRESSION FOR VIDEO CODING,” IN *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, OCT. 2019. ACCESS AT [HTTPS://STUDIOS.DISNEYRESEARCH.COM/2019/10/27/NEURAL-INTER-FRAME-COMPRESSION-FOR-VIDEO-CODING/](https://studios.disneyresearch.com/2019/10/27/neural-inter-frame-compression-for-video-coding/)
- [7] J. CAMPOS, S. MEIERHANS, A. DJELOUAH, AND C. SCHROERS, “CONTENT ADAPTIVE OPTIMIZATION FOR NEURAL IMAGE COMPRESSION,” IN *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, JUN. 2019. ACCESS AT [HTTPS://OPENACCESS.THECVF.COM/CONTENT\\_CVPRW\\_2019/HTML/CLIC\\_2019/CAMPOS\\_CONTENT\\_ADAPTIVE\\_OPTIMIZATION\\_FOR\\_NEURAL\\_IMAGE\\_COMPRESSION\\_CVPRW\\_2019\\_PAPER.HTML](https://openaccess.thecvf.com/content_CVPRW_2019/html/CLIC_2019/CAMPOS_CONTENT_ADAPTIVE_OPTIMIZATION_FOR_NEURAL_IMAGE_COMPRESSION_CVPRW_2019_PAPER.HTML)

## PUBLICATIONS: PHILOSOPHY

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- [1] J. CAMPOS, “MAHAYANA BUDDHIST ETHICS: DEONTOLOGICAL, VIRTUE-BASED OR CONSEQUENTIALIST? AN OPTIMIZATION THEORY PERSPECTIVE.” ACCESS AT [HTTPS://RAW.GITHUBUSERCONTENT.COM/JOAQUIMCAMPOS/JOAQUIMCAMPOS.GITHUB.IO/MAIN/ASSETS/PUBS/MAHAYANA\\_ETHICS.PDF](https://raw.githubusercontent.com/joaquimcampos/joaquimcampos.github.io/main/assets/pubs/mahayana_ethics.pdf)
- [2] J. CAMPOS, “ON THE WRONGNESS OF KILLING NON-HUMAN ANIMALS,” COURSE THESIS, ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE, MAY 2018. ACCESS AT [HTTPS://RAW.GITHUBUSERCONTENT.COM/JOAQUIMCAMPOS/JOAQUIMCAMPOS.GITHUB.IO/MAIN/ASSETS/PUBS/ON\\_THE\\_WRONGNESS\\_OF\\_KILLING\\_ANIMALS.PDF](https://raw.githubusercontent.com/joaquimcampos/joaquimcampos.github.io/main/assets/pubs/on_the_wrongness_of_killing_animals.pdf)

## PATENTS

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- [1] C. SCHROERS, S. MEIERHANS, J. CAMPOS, J. MCPHILLEN, A. DJELOUAH, E. VARIS DOGGETT, S. LABROZZI, AND X. YUANYI, “CONTENT ADAPTIVE OPTIMIZATION FOR NEURAL DATA COMPRESSION,” US PATENT 11057634, JUL., 2021. ACCESS AT [HTTPS://PATENTS.GOOGLE.COM/PATENT/US11057634B2/EN](https://patents.google.com/patent/US11057634B2/en)

- [2] C. SCHROERS, J. CAMPOS, A. DJELOUAH, X. YUANYI, E. VARIS DOGETT, J. MCPHILLEN, AND S. LABROZZI, "SYSTEMS AND METHODS FOR RECONSTRUCTING FRAMES," US PATENT 10 972 749, APR, 2021. ACCESS AT [HTTPS://PATENTS.GOOGLE.COM/PATENT/US10972749B2/EN](https://patents.google.com/patent/US10972749B2/en)
- [3] C. SCHROERS, J. CAMPOS, A. DJELOUAH, X. YUANYI, E. VARIS DOGETT, J. MCPHILLEN, AND S. LABROZZI, "SYSTEMS AND METHODS FOR GENERATING A LATENT SPACE RESIDUAL," US PATENT 11 012 718, MAY, 2021. ACCESS AT [HTTPS://PATENTS.GOOGLE.COM/PATENT/US11012718B2/EN](https://patents.google.com/patent/US11012718B2/en)