



JOAQUIM CAMPOS

PERSONAL DATA

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IN BRIEF

I AM AN ENGINEER AND RESEARCHER SPECIALIZING IN SIGNAL PROCESSING AND ARTIFICIAL INTELLIGENCE, AND I AM ALSO A PYTHON DEVELOPER. IN ACADEMIA, MY FOCUS HAS BEEN ON DEEP LEARNING, LEARNING THEORY, IMAGE AND VIDEO COMPRESSION, AND INVERSE PROBLEMS. ADDITIONALLY, I CO-FOUNDED RADIOBOOKS, A STARTUP THAT ASSISTS INDEPENDENT AUTHORS AND SELF-LEARNERS IN AUTOMATICALLY CONVERTING THEIR BOOKS INTO AUDIOBOOKS USING AI. THROUGH THIS VENTURE, I HAVE GAINED KNOWLEDGE IN BOTH PRODUCT DEVELOPMENT AND 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.

EDUCATION

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| 2020 FEB | MSC IN COMMUNICATION SYSTEMS. |
| 2016 SEP | <i>Specialization: Signals, Images and Interfaces.</i> EPFL (ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE), LAUSANNE, SWITZERLAND. SCHOOL: SCHOOL OF COMPUTER AND COMMUNICATION SCIENCES . GRADE: 5.67/6.00 — RANKING: 2ND/31 FOCUS ON SIGNAL PROCESSING AND ARTIFICIAL INTELLIGENCE. MASTER'S THESIS: <i>Higher-Order Regularization Methods for Supervised Learning.</i> |
| 2016 JUL | BSC IN ELECTRICAL AND COMPUTER ENGINEERING. |
| 2013 SEP | UNIVERSIDADE DE LISBOA , LISBON, PORTUGAL. SCHOOL: INSTITUTO SUPERIOR TÉCNICO . GRADE: 16.4/20.0 |

WORK EXPERIENCE

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| 2023 DEC | CO-FOUNDER AT RADIOBOOKS. |
| 2022 AUG | <i>Converting books into audiobooks automatically using Artificial Intelligence</i> <ul style="list-style-type: none">• DESIGNED AND BUILT AN APP FOR REVISING AI-GENERATED AUDIO.• OUR TECH STACK INCLUDED PYTHON, FASTAPI, MONGODB, PYTEST, DOCKER, GITHUB ACTIONS, CODECOV, FLY.IO, AWS S3, AND BETTER STACK. |
| 2021 SEP | RESEARCH AND TEACHING ASSISTANT |
| 2020 APR | <i>Supervised Learning with Sparsity-Promoting Regularization</i> BIOMEDICAL IMAGING GROUP , EPFL, LAUSANNE, SWITZERLAND. <ul style="list-style-type: none">• DEVELOPED A NOVEL FRAMEWORK TO LEARN THE ACTIVATION FUNCTIONS OF A NEURAL NETWORK;• DESIGNED A SPLINE-BASED SUPERVISED LEARNING METHOD WHICH CONSTRUCTS PIECEWISE-LINEAR MODELS WITH FEW REGIONS (SPARSE). |
| 2018 AUG | RESEARCH INTERN |
| 2019 MAR | <i>Image and Video Compression using Deep Learning</i> DISNEY RESEARCH STUDIOS , ZURICH, SWITZERLAND. <ul style="list-style-type: none">• DEVELOPED THE FIRST CONTENT-ADAPTIVE NEURAL IMAGE COMPRESSION SCHEME;• AIDED IN THE CONSTRUCTION OF A STATE-OF-THE-ART NEURAL VIDEO COMPRESSION FRAMEWORK. |

TEACHING EXPERIENCE

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| CURRENT | TEACHING ASSISTANCE IN THE COURSES MICRO-310/11: SIGNALS AND SYSTEMS I/II |
| 2020 SEP | EPFL (ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE), LAUSANNE, SWITZERLAND. TAUGHT BY PROF. MICHAEL UNSER TO THE <i>Life Sciences</i> AND <i>Microengineering</i> SECTIONS. |
| CURRENT | SUPERVISION OF MASTER SEMESTER PROJECTS |
| 2020 SEP | EPFL (ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE), LAUSANNE, SWITZERLAND. CO-SUPERVISOR OF TWO MASTER SEMESTER PROJECTS ON LIPSCHITZ-CONSTRAINED GANs . |

SKILLS

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| EXPERTISE: | BOTH THEORETICAL AND PRACTICAL ASPECTS OF MACHINE LEARNING, DEEP LEARNING, AND SIGNAL PROCESSING; PYTHON DEVELOPMENT. |
| DEVOPS EXPERIENCE: | PYTHON, FASTAPI, PYTEST, PYTORCH, CI/CD, BASH, LINUX, MONGODB, DOCKER, GITHUB ACTIONS, CODECOV, AWS, FLY.IO, BETTER STACK. |
| OTHER SKILLS: | DURING MY ACADEMIC YEARS, I DEVELOPED VALUABLE PRESENTATION, WRITING, AND TEACHING SKILLS, MUCH OF WHICH I OWE TO PROF. MICHAEL UNSER. |

LANGUAGES

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

THE PUBLICATIONS CAN BE CONSULTED [HERE](#).

PUBLICATIONS: SCIENCE

- [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 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

- [1] J. CAMPOS, “MAHAYANA BUDDHIST ETHICS: DEONTOLOGICAL, VIRTUE-BASED OR CONSEQUENTIALIST? AN OPTIMIZATION THEORY PERSPECTIVE.”
- [2] J. CAMPOS, “ON THE WRONGNESS OF KILLING NON-HUMAN ANIMALS,” COURSE THESIS, ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE, MAY 2018.

PATENTS

- [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.