



# JOAQUIM CAMPOS

## PERSONAL DATA

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PLACE AND DATE OF BIRTH: LISBON, PORTUGAL, ON 10 FEBRUARY 1996  
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## IN BRIEF

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I AM AN ELECTRICAL AND COMPUTER ENGINEER, PROGRAMMER, AND RESEARCHER SPECIALIZED IN SIGNAL PROCESSING AND ARTIFICIAL INTELLIGENCE. PROFESSIONALLY, I HAVE ENGAGED WITH DEEP LEARNING, LEARNING THEORY, IMAGE AND VIDEO COMPRESSION, AND INVERSE PROBLEMS. OUTSIDE THE SCOPE OF MY SCIENTIFIC EXPERTISE, I DEDICATE MY TIME TO EXPLORING PHILOSOPHY, PSYCHOLOGY, MEDITATION, ETHICS, AND SOCIAL SYSTEMS. I FIND JOY IN TACKLING PROBLEMS HOLISTICALLY, DRAWING INSPIRATION FROM BOTH ANCIENT AND MODERN WISDOM, AND CONSIDERING THE ENTIRE PIPELINE FROM PHILOSOPHICAL AND SCIENTIFIC INQUIRY TO PRACTICAL APPLICATION. I APPRECIATE ENGAGING IN THOUGHTFUL DISCUSSIONS, BEING EXPOSED TO DIFFERENT POINTS OF VIEW, AND—WHEN SUITABLE—SHARING THE LITTLE I KNOW WITH OTHERS.

## EDUCATION

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2016 JUL PRESENT	<b>MSC IN Applied Buddhist Studies.</b> <b>Tergar Institute</b> , KATHMANDU, NEPAL. PROGRAM ON BUDDHIST PHILOSOPHY AND MEDITATION. HEAD TEACHER: MINGYUR RINPOCHE. MASTER'S PROJECT: <i>Communicating Madhyamaka Philosophy</i> . THE COURSE WILL CONTINUE ON-SITE BETWEEN MID-SEPTEMBER AND MID-DECEMBER 2024.
2020 FEB 2016 SEP	<b>MSC IN Communication Systems.</b> <b>SPECIALIZATION: Signals, Images and Interfaces.</b> <b>École Polytechnique Fédérale de Lausanne</b> , SCHOOL OF COMPUTER SCIENCE AND COMMUNICATION SCIENCES, LAUSANNE, SWITZERLAND. 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 2013 SEP	<b>BSC IN Electrical and Computer Engineering.</b> <b>Universidade de Lisboa, Instituto Superior Técnico</b> , LISBON, PORTUGAL. 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"><li>DESIGNED AND CREATED AN APP FOR REVISING AI-GENERATED AUDIO.</li></ul>
2021 SEP	RESEARCH AND TEACHING ASSISTANT
2020 APR	TOPIC: <i>Supervised Learning with Sparsity-Promoting Regularization</i> 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	RESEARCH INTERN
2019 MAR	TOPIC: <i>Image and Video Compression using Deep Learning</i> 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>

## TEACHING EXPERIENCE

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CURRENT	TEACHING ASSISTANCE IN THE COURSES <b>MICRO-310/11: Signals and Systems I/II</b>
2020 SEP	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	École Polytechnique Fédérale de Lausanne, LAUSANNE, SWITZERLAND CO-SUPERVISOR OF TWO MASTER SEMESTER PROJECTS ON <a href="#">LIPSCHITZ-CONSTRAINED GENERATIVE ADVERSARIAL NETWORKS (GANs)</a> .

## 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, MACHINE LEARNING, AND DEEP LEARNING.
PROGRAMMING:	C, PYTHON, FASTAPI, PYTORCH, BASH, MATLAB, $\text{\LaTeX}$ , BACKEND DEVELOPMENT AND DEPLOYMENT
OTHER SKILLS:	DURING MY ACADEMIC YEARS, I DEVELOPED VALUABLE PRESENTATION, WRITING, AND TEACHING SKILLS, MUCH OF WHICH I OWE TO PROF. MICHAEL UNSER.

THE PUBLICATIONS CAN BE CONSULTED HERE: <https://joaquimcampos.com/pubs.html>.

## 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 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."
- [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.