

Gustau Camps-Valls

Full professor, Researcher
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Personal Information

current position Full professor at Dep. Eng. Electrònica, Universitat de València
Head of Image and Signal Processing (ISP) group, Universitat de València

Brief CV

Gustau Camps-Valls, <http://www.uv.es/gcamps>, earned a Ph.D. degree in Physics (2002, *summa cum laude*) from the Universitat de València, and he is currently **Full Professor in Electrical Engineering** in the same university, where he lectures time series analysis, signal processing, image processing, AI and machine learning, and advanced remote sensing data processing. **He is the Group Leader of the Image and Signal Processing (ISP) group, <http://isp.uv.es>, an interdisciplinary group of 50 researchers working in the intersection of AI and machine learning for Earth and Climate sciences. His research interests involve the development of novel AI algorithms for better monitoring our planet from space, understanding the processes and extreme events, and achieving a sustainable Earth. He currently coordinates several European projects in these areas and assists/ed the aerospace industry (ESA, EUMETSAT, NASA) as a consultant and member of Advisory Boards.** He has been Visiting Researcher at the Remote Sensing Laboratory (Univ. Trento, Italy) in 2002, the Max Planck Institute (Tübingen, Germany) in 2009 and 2016, and as an Invited Professor at the EPFL (Lausanne, Switzerland) in 2013, and at MPI (Jena, Germany) in 2018.

Prof. Camps-Valls research activities have resulted so far in **a total of 300 peer-reviewed international journal papers, 300+ international conference papers, 25 chapters, and in editing 6 books on remote sensing, image processing and machine learning**: “Kernel methods in bioengineering, signal and image processing” (IGI, 2007), “Kernel methods for remote sensing data analysis” (Wiley & Sons, 2009), “Remote Sensing Image Processing” (MC, 2011), “Digital Signal Processing with Kernel Methods” (Wiley & Sons, 2018), and “Deep Learning for the Earth Sciences” (Wiley & Sons, 2021). **He has a *h*-index of 87 in Google Scholar, with 33000+ citations, from which 22000+ were received in the last 5 years.** He was listed as a Clarivate Highly Cited Researcher in 2011, 2021 and 2022, and Thomson Reuters ScienceWatch identified my activities as Fast Moving Front research as the Essential Science Indicators identified me as the author of the most-cited paper in the area of Engineering in 2011. The seminal work was about introducing kernel methods to the remote sensing and geoscience community. **More than 5 papers received 1000+ citations each, and a paper about information fusion with kernels received the Google Classic paper award.** He has published seminal papers in Nature, Nature Communications, Science Advances, and PNAS.

He is a referee and Program Committee member of many international journals and conferences. He has served on the Program Committees of the International Society for Optical Engineers (SPIE) Europe, International Geoscience and Remote Sensing Symposium (IGARSS), Machine Learning for Signal Processing (MLSP), and International Conference on Image Processing (ICIP) among others. He was the Technical Program Chair at IEEE IGARSS 2018, València (2400+ attendees), and the General Chair of AISTATS 2022, València. Since 2007 he is member of the Data Fusion technical committee of the IEEE GRSS, and of the MLSP TC of IEEE SPS. He is (or has been) an Associate Editor of “IEEE Trans. Sig. Proc.”, “IEEE Sig. Proc. Lett.”, “IEEE Geosc. Rem. Sens. Lett.”, and Guest Editor of “IEEE Jour. Sel. Topics in Sig. Proc.”. **He was member of the MTG-IRS Science Team (MIST) of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).** Prof. Camps-Valls is a habitual evaluator of project proposals for H2020 programs (ERC, FET), NSF, China Science Foundation, Swiss Science Foundation, etc.

Since 2019 he has been an ELLIS Fellow coordinating the ‘Machine Learning for Earth and Climate Sciences’ research program of ELLIS.eu and foundational node of the AI Doctoral Academy (i-AIDA) for the advancement of AI in Europe. Prof. Camps-Valls was included in the prestigious IEEE Distinguished Lecturer program of the IEEE GRSS (2017-2019) and is deeply involved in the ITU AI4Good seminar series for dissemination of AI and sustainability. Other dissemination activities are more regional, like the active participation in valgrAI, which coordinates AI training and research in the Valencia autonomous region.

In 2018 he was elevated to IEEE Fellow in two Societies (Geosciences and Signal Processing, 2018), and since 2019 he has been an Invited Professor Fellow of the ESA Philab, since 2021 acts as a board member of the European Science Foundation advising ESA, EU and national space agencies, and in 2022 was elevated to Fellow of the European Academy of Sciences (EurASc), the Academia Europaea (AE), and the Asia-Pacific Artificial Intelligence Association (AAIA). **Prof. Camps-Valls has received two European Research Council (ERC) grants in two different areas: an ERC Consolidator grant on “Statistical learning for Earth observation data analysis” (2015) and an ERC Synergy grant on “Understanding and Modelling the Earth system with machine learning” (2019) to advance AI for the Earth and Climate Sciences.**

Degrees/Academics/Education

- PhD Physics. Universitat de València, September 2002.
MSc. Physics. Universitat de València, June 2000.
Bsc. Elec. Engin. Universitat de València, July 1998.
BSc Physics. Universitat de València, July 1996.

Professional Experience

Academic at the Universitat de València, Spain

- 10.2017– Full Professor, Catedrático
10.2009–10.2018 PhD Program coordinator. Electrical Eng. Dept. <http://die.uv.es>
10.2008– Head of 'Image and Signal Processing Group', <http://isp.uv.es>
10.2007–10.2008 Associate professor. Electrical Eng. Dept. <http://die.uv.es>
10.2002–09.2007 Tenure Track - Postdoc. Assist. Prof.
10.1998–09.2002 Assistant professor.

Visiting Researcher / Invited Professor

- 05.2018–07.2018 Max Planck Institute for Biogeochemistry, Jena, Germany.
05.2016–10.2016 Max Planck Institute Intelligent Systems, Tübingen, Germany.
05.2013–07.2013 École Polytechnique Fédérale de Lausanne, Switzerland.
05.2009–10.2009 Max Planck Institute Intelligent Systems, Tübingen, Germany.
05.2004–10.2004 Università degli Studi di Trento, Italy.
05.2001–11.2001 Universidad Carlos III de Madrid, Spain.

Selected research funding

- 02/11–07/12. Atmospheric corrections for fluorescence signal over land. ESA. 200K€
06/07–12/08. FLEX Performance Analysis and Requirements Consolidation Study. ESA. 200K€
09/07–03/09. Atmospheric Corrections for Fluorescence Signal Retrieval (FLEX-AC). ESA. 200K€
01/05–01/07. Advanced hyperspectral image classifiers. Regional Gov. València. GV011. PI. 36K€
01/06–12/08. Semi-supervised learning for hyperspectral image classification. Integrated Action Spain-Italy. MEC/HI2005-0228. PI. 22K€
12/08–12/12. Multimodal Interaction in Pattern Recognition and Computer Vision, MIPRCV. Spanish Ministry of Education and Science. CSD2007-00018. PI. 178K€
09/09–09/10. Consolidation of scientific baseline for MTG-IRS L2 processing: role of non-linear regression methods. EUMETSAT. PI. 122K€
05/09–09/09. Normalized interpolation of multisensor images. National Geographic Agency (IGN). PI. 18K€
12/10–12/11. Spectral-temporal image fusion. National Geographic Agency (IGN). PI. 24K€
01/12–01/14. FLEX/S3 Tandem Mission Performance Analysis and Requirements Consolidation Study. 295K€
01/11–01/13. RE-using field reference data in space and time for vegetation mapping: the potential of semi-supervised and active LEARNing techniques. P. Scheunders, G. Camps-Valls (co-PI). 20K€
01/13–12/15. SenSyF: Sentinels Synergy Framework. EU (FP7-Space). J. Moreno, G. Camps-Valls (co-PI). FP7-SPA.2012.1.1-05. 141K€
01/13–12/16. Mapping and the citizen sensor. ICT COST Action. Member of the Management Committee.
01/13–12/15. LIFE-VISION: Learning Image Features to Encode Visual Information. Spanish Ministry of Economy and Competitiveness, 2012. TIN2012-38102-C03-01. PI. 104K€
01/14–12/14. Improvement of the current nonlinear regression retrieval (NLR) implemented within the MTGIRS prototype processor for monitoring (MTGIRS L2 PPM) to generate whole globe profiles of temperature, water vapour and ozone. EUMETSAT. PI. 85K€
01/15–07/15. Study on pattern recognition based cloud detection over landmarks. EUMETSAT. PI. 65K€
06/15–06/18. Advances in Machine Learning for Large Scale Remote Sensing Data Processing. MINECO. 80K€
06/17–06/20. CLOUDSAT: Cloud Screening of Satellite Images. MINECO. 272K€
06/15–06/20. Statistical learning for remote sensing data analysis. ERC consolidator grant. PI. 1,7M€
09/20–08/22. ELISE: European Learning And Intelligent Systems Excellence. ICT-48, Universitat de València. 12M€, UV: 230k€
01/21–12/23. DeepCube: Explainable AI pipelines for big Copernicus data. EU H2020, 2021-2024 4M€, UV: 450K€)

- 01/20–12/23. iMIRACLI: innovative Machine learning to constrain Aerosol-cloud Climate Impacts. ETN Marie Curie Training Network. 2M€, UV: 250K€
- 06/20–06/22. SCALE: Causal inference in the human-biosphere coupled system (SCALE). Fundación BBVA. 68K€
- 01/21–12/23. DeepCube: Explainable AI pipelines for big Copernicus data. EU H2020, 2021-2024 4M€, UV: 450K€
- 01/21–12/23. DeepExtremes: DeepExtremes: Multi-Hazards, Compounds and Cascade events, G. Camps-Valls, 01/02/22 AI for Science. ESA, 2022-2024 400k€, UV: 90k€
- 01/21–12/23. OpenSR: Robust, accountable super-resolution for Sentinel-2 and beyond. Towards Explainable AI: Application to Trustworthy Super-Resolution, L. Gomez, G. Camps-Valls (coPI) 01/02/22. ESA, 2022-2024 1M€, UV: 300k€
- 09/21–10/25. XAIDA: Extreme AI for Detection and Attribution. EU H2020, 2021-2024 4M€, UV: 350K€
- 09/20–08/26. Understanding and Modeling the Earth System with Machine Learning. ERC Synergy grant. PI (with Eyring, Reichstein and Gentile). 9,89M€, UV: 2.3M€
- 05/22–05/24. Causal Inference to Understand the Impact of Humanitarian Interventions on Food Security in Africa. Microsoft Research - Microsoft Climate Research Initiative, Universitat de València: G. Camps-Valls (PI), G. Varando (Co-PI), JM. Tarraga (Scientific Researcher), University of Reading: T. Shepherd (PI), R. Cornforth (Co-PI), 2022-2024.
- 01/22–31/25. AI for complex systems: Brain, Earth, Climate, Society. Generalitat Valenciana - Regional Ministry of Education, Research, Culture and Sport under PROMETEO programme. G. Camps-Valls, M. Piles. 600k€
- 09/20–08/26. ELIAS: European Lighthouse of AI for sustainability. HORIZON-RIA. N. Sebe, UV: G. Camps-Valls (PI) 13M€, UV: 350k€

Technology transfer

- It is a common practice in the group to include software solutions or toolboxes as a delivery product in projects, cf. <http://isp.uv.es/software.html>, and delivered advanced AI methods and tools to ESA, EUMETSAT and NASA as preparation for future satellite missions.
- Some computational improvements in classification methods for remote sensing have been included in official ESA products, such as BEAM-The ENVISAT-MERIS and AATSR Toolbox, <http://www.brockmann-consult.de/beam/>.
- Coordinator of the ELLIS research program 'Machine Learning for Earth and Climate' to define the European scientific agenda in these topics, and to foster adoption and transfer of AI to industry and society.
- Consultant on data science for the venture capital 'Synóptikos'.
- Advisory committee and consultant of ESA PhiLab on 'AI4Earth'.
- Patent: "Method, apparatus and software for colour image compression based on non-linear perceptual representations and machine learning", J Malo, J Gutiérrez, G Camps-Valls, and MJ Luque. 06/20/2008. Ref. P200801943.

Organizing committees and conference reviewer

Technical/Program committee	IGARSS, IWANN, SPIE RSS, IEEE MLSP, IEEE-MULTITEMP, IEEE CISP, ICANN, IEEE WCNC, ICPRAM, ICANN
Session Chair	IEEE IGARSS, IEEE ICIP, IEEE MLSP.
Keynote Speaker	SPIE conference on Remote Sensing 2011, Prague, Czech Rep., NOBIM Norwegian conf on machine learning and pattern recognition.
Technical Chair	IEEE IGARSS 2018, València (2400 attendees)
General Chair	IEEE MLSP 2012. Santander; AISTATS 2022, València

Editorial activities

Book ed.	"Deep Learning for the Earth Sciences" (Wiley & sons, 2021).
Book ed.	"Digital Signal Processing with Support Vector Machines" (Wiley & sons, 2017).
Book ed.	"Sensing Image Processing" (Morgan & Claypool Publishers, 2011).
Book ed.	"Kernel methods for remote sensing data analysis" (Wiley & sons, 2009)
Book ed.	"Kernel methods in bioengineering, signal and image processing" (IGI, 2007)
Associate Editor	"IEEE Transactions on Signal Processing"
Associate Editor	"IEEE Signal Processing Letters"
Associate Editor	"IEEE Geoscience and Remote Sensing Letters"
Associate Editor	"ISRN Signal Processing Journal"
Guest Editor	"IEEE Journal of Selected Topics in Signal Processing"
Guest Editor	"IEEE Geoscience and Remote Sensing Magazine"
Guest Editor	"Sensing and Imaging (Springer)"

Memberships

Fellow Member	Academia Europaea (AE) (2022–)
Fellow Member	European Academy of Sciences (EurASc) (2022–)
Fellow Member	Asia-Pacific Artificial Intelligence Association (AAIA) (2021–)
Advisor Com	European Science Foundation (ESF) - Earth/Space branch (2021–)
Member	Association for Computing Machinery (ACM) (2021–)
Fellow Member	ELLIS (2019–)
Fellow Member	IEEE, in both Geosciences and Signal Processing societies (2018–)
Member	International Society for Optical Engineers (SPIE) (2018–)
Senior Member	IEEE (2007–)
Member	Association for Computing Machinery (SP) (2021–)
Advisor Com	European Space Agency (ESA) - Φ -Lab (2019–)
Member	American Geophysical Union, AGU (2017–)
Member	European Geosciences Union, AGU (2017–)
Member	Data Fusion Technical Committee of the IEEE Geosc. Rem. Sens. Soc. (2009–)
Member	Machine Learning for Signal Processing Technical Committee of the IEEE-SPS (2009–2014)

Reviewer Activities & Services

Conferences	MLSP, EUSIPCO, ICASSP, IWANN, ICANN, CIP, ICIP, IGARSS, SPIE, ICML, NIPS, ECML, KES, Whispers, Urban, ICPRAM, etc.
Journals	IEEE Transactions on Geoscience and Remote Sensing, IEEE Geoscience and Remote Sensing Letters, IEEE Transactions on Signal Processing, IEEE Signal Processing Letters, IEEE Signal Processing Magazine, IEEE Journal of Selected Topics in Signal Processing, IEEE Transactions on Image Processing, IEEE Transactions on Neural Networks, IEEE Transactions on Pattern Analysis and Machine Intelligence, Journal of Machine Learning Research, Pattern Recognition, Neurocomputing, Remote Sensing of Environment, Machine Learning, Information Fusion, Signal Processing, Journal of the Optical Society of America, Applied Optics, Mathematical Reviews, International Journal of Remote Sensing, PLOS One
Book Proposals	IGI Inc., Springer-Verlag, IOS Press, Wiley & Sons.
Projects	Swiss National Science Foundation (SNSF), Belgian Science Foundation, European Space Agency (ESA), Spanish National Research Programme, Romanian National Council for Research and Development, the Hong Kong Strategic Research funding programme, Finish council, H2020 SPACE, H2020 FET, H2020 Marie Curie, PRIMA, ERC StG and ERC CoG, etc.
Advisory board	Meteosat Third Generation - Infrared Sounder (MTG-IRS) Mission Advisory Group of EUMETSAT (2010–), H2020 projects, Consultant of ESA PhiLab on 'AI4Earth', and Evaluation panel of new research groups in France, Switzerland, Netherlands and Germany.

Awards & Recognitions

2022	Highly Cited Researcher in the field of Geosciences
2022	Fellow Member of Academia Europaea
2022	Fellow Member of European Academy of Sciences
2021	Fellow Member of Asia-Pacific Artificial Intelligence Association (AAIA)
2021	Highly Cited Researcher in the field of Geosciences
2021	Member of the European Space Sciences Committee of the European Science Foundation
2020	InCites TM: 6 papers ranked as Essential Science Indicators and 1 Hot Paper
2020	ERC Synergy Grant (ERC-SyG) 2020 (with V. Eyring, M. Reichstein, P. Gentine)
2018	Elevation to "IEEE Fellow" (in both GRSS and SPS chapters)
2018	InCites: Four papers ranked as Essential Science Indicators
2017	Best Paper Award in IEEE IGARSS 2018 on causal inference with kernels
2017	Elevation to "IEEE Distinguished Lecturer" (GRSS chapter)
2017	Google classic paper in Engineering and computer science / Remote sensing
2015	Winner of the "2015 IEEE GRSS Data Fusion Contest"
2015	ERC Consolidator Grant (ERC-CoG) 2015
2014	Best Paper Award in IEEE Whispers 2014.
2015	Winner of the "2015 IEEE GRSS Data Fusion Contest"
2013	Best Paper Award of IEEE Geoscience and Remote Sensing Society 2013 and "Editor's Choice OpenAccess paper"
2012	Best Paper Award in the IEEE IGARSS 2012 Student Prize Paper competition (Munich, Germany).
2011	Best paper of the IEEE Geoscience and Remote Sensing Society 2011
2011	Thomson Reuters Highly Cited Researcher
2011	Thomson Reuters ScienceWatch: Fast Moving Front research
2011	Thomson Reuters Essential Science Indicators: most-cited paper in Engineering in 2011

2009 2nd Best Paper Student Competition of the Joint Urban Remote Sensing Event 2009 (Shanghai, China)
 2009 3rd Best Paper Student Competition of the IEEE IGARSS09 (Capetown, South Africa)
 2009 Best paper award in IEEE MLSP (Grenoble, France)

Publications

- More than 300 journal papers and 300 conference papers.
- Check the full list of publications in
 - Google Scholar
 - Publons
 - ISP group.

Invited talks, lectures and courses

Intnl. Tutorials MLSP-2014, IEEE-Whispers, ESA course, IEEE-IGARSS-2015
 Session Chair IEEE IGARSS 2006-2015, IEEE ICIP 2009, SPIE Remote sensing 2007-2013, MLSP 2009-2012
 Keynote Speaker SPIE conference on Remote Sensing 2011, NOBIM Norwegian conf on machine learning and pattern recognition 2013, SIU-2014 Turkey, CVPR-2015 (workshop on remote sensing), StatLearn'15, ECML'15 (workshop on time series analysis)
 General Chair IEEE MLSP 2012. Santander, Spain
 Technical Chair IEEE IGARSS 2018, València, Spain
 IEEE DL IEEE Distinguished Lecturer, 2017-2019, involving many talks worldwide in China, India, Germany, Switzerland, Brasil, Canada, ...
 Invited talks More than 100 invited talks at conferences and workshops, <http://isp.uv.es/talks.html>

PhD Thesis Supervision

I supervised 40+ master students and 10+ PhD students in the last decade. Currently, (co)advising 15 PhDs.

2009 "Semi-supervised kernel machines in hyperspectral image classification". Tatyana V. Bandos
 2010 "Cloud screening algorithm for MERIS and CHRIS satellite sensors". Luis Gómez Chova
 2010 "Advances in Hyperspectral Kernel Target Detectors". Luca Capobianco
 2011 "Hyperspectral detection of rotten citrus". Juan Gómez Sanchis
 2011 "Perceptual and Statistical Image Analysis with Kernels". Valero Laparra Pérez-Muelas
 2014 "Kernel Feature Extraction for Remote Sensing Data Analysis". Emma Izquierdo
 2015 "Statistical Learning for Image Quality Assessment". Vicent Talens
 2016 "Structured kernels for biophysical parameter retrieval". Manuel Campos
 2020 "Changes in the coupled Biosphere-Human System". Guido Kraemer
 2020 "Integrating Physics Modelling with Machine Learning for Remote Sensing". Daniel Svendsen
 2021 "Quantifying information and uncertainty in Earth sciences". Emmanuel Johnson
 2021 "Advances in kernel anomaly change detection". J. A. Padrón
 2022 "Advances in causal inference for geoscience and remote sensing". Emiliano Diaz
 2022 "Spatio-temporal analysis and causal inference of microwave EO data". Diego Bueso
 2022 "Advances in machine learning for remote sensing crop yield prediction". Anna Mateo
 2023 "Machine learning for sea level variability forecasting and impact assessment". Cristina Radin
 2023 "High resolution Products for better quantifying the terrestrial biosphere". Laura Martinez
 2023 "Detection of aerosol-cirrus cloud interactions in satellite data". Kai Jeggle
 2023 "Detection of aerosol-cloud interactions in observations space". Jessenia Gonzalez Villarreal
 2023 "Physics-aware and explainable ML for dust and cloud properties retrieval". Paolo Pelucchi
 2023 "Encoding physical priors in deep learning". William Martinez
 2023 "Understanding drivers of forest mortality with deep learning and XAI". Mohit Anand
 2023 "Attribution of extreme impacts in European ecosystems with machine learning". Tristan Williams
 2023 "Characterization of hybrid machine learning". Kai-Hendrik Cohrs
 2024 "Causal inference in the human-biosphere coupled system". Jose Maria Tarraga
 2024 "Fair learning for detection and attribution". Jordi Cortes
 2024 "Anomaly and extreme event detection with attention networks". Maria Gonzalez
 2024 "Drought detection with physics-aware roll-out models". Mengxue Zhang
 2024 "Bayesian Neural Networks in EO". Spyros Kondylatos
 2024 "Deep Learning for Fire Danger Forecasting using Earth Observation Data". Ioannis Prapas

- 2026 "Causality and extremes". Deborah Bassotto
- 2026 "Learning causal feature representations". Homer Durand
- 2026 "Causal inference for food insecurity". Jordi Cerdà

In the last 5 years I was a member of examination committees for 20 PhD students in Europe (EPFL, Paris Mines, Tromsø, Madrid, Trento, etc). Several of the alumni, visitors and early career scientists established influential careers in various areas of remote sensing data analysis.

Main collaborators

- Markus Reichstein, MPI Biogeochemistry, Jena, Germany
- Veronika Eyring, DLR, Germany
- Pierre Gentile, Columbia University, USA
- Steve Running, NTSG, Uni Montana, USA
- Miguel Mahecha, Uni Leipzig, DE
- Sebastian Sieppel, ETH Zurich, CH
- Jakob Zscheischler, Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany
- Jakob Runge, DLR, Germany
- Devis Tuia, EPFL, CH
- Diego Miralles, Uni Ghent, Belgium
- Dino Sejdinovic, Uni Oxford, UK

Major collaborators, organizations, companies and networks in <https://isp.uv.es/collaborators.html>.

Publiometry

- Google Scholar: $h = 86$, 33000+ cites
- Main author of the three most cited papers in relevant remote sensing journals.
- Google Scholar — Publons — ORCID — ResearchGate



València, April 24, 2023
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