



HAL
open science

Hyper-Realistic and Immersive Imaging for Enhanced Quality of Experience

Frédéric Dufaux

► **To cite this version:**

Frédéric Dufaux. Hyper-Realistic and Immersive Imaging for Enhanced Quality of Experience. 1st Workshop on Photorealistic Image and Environment Synthesis for Multimedia Experiments, ACM Multimedia, Oct 2022, Lisbon, Portugal. hal-03801009

HAL Id: hal-03801009

<https://hal.science/hal-03801009>

Submitted on 6 Oct 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Hyper-Realistic and Immersive Imaging for Enhanced Quality of Experience

Frederic Dufaux

Université Paris-Saclay, CNRS, CentraleSupélec, L2S
91190 Gif-sur-Yvette, France
Frederic.dufaux@l2s.centralesupelec.fr

ABSTRACT

Producing truly realistic and immersive digital imaging is widely seen as the ultimate goal towards further improving Quality of Experience (QoE) for end users of multimedia services. The human visual system is able to perceive a wide range of colors, luminous intensities, and depth, as present in a real scene. However, current traditional imaging technologies cannot capture nor reproduce such a rich visual information. Recent research innovations have made it possible to address these bottlenecks in multimedia systems. As a result, new multimedia signal processing areas have emerged such as ultra-high definition, high frame rate, high dynamic range imaging, light field, and point cloud.

These technologies have the potential to bring a leap forward for upcoming multimedia systems. However, the effective deployment of hyper-realistic video technologies entails many technical and scientific challenges. In this talk, I will discuss recent research activities covering several aspects of hyper-realistic imaging, including point cloud compression, light field compression, and semantic-aware tone mapping for high dynamic range imaging.

CCS Concepts/ACM Classifiers

• Computing methodologies; • Human-centered computing.

Author Keywords

High dynamic range; tone mapping; plenoptic imaging; light field; point cloud; compression.

BIOGRAPHY

Frederic Dufaux is a CNRS Research Director at Université Paris-Saclay, CNRS, CentraleSupélec, Laboratoire des Signaux et Systèmes (L2S, UMR 8506), where he is head of the Telecom and Networking hub. He received his M.Sc. in physics and Ph.D. in electrical engineering from EPFL in 1990 and 1994 respectively.

Frederic is a Fellow of IEEE. He was Vice General Chair of ICIP 2014, General Chair of MMSP 2018, and Technical Program co-



Chair of ICIP 2019 and ICIP 2021. He served as Chair of the IEEE SPS Multimedia Signal Processing (MMSP) Technical Committee in 2018 and 2019. He was a member of the IEEE SPS Technical Directions Board from 2018 to 2021. He is Chair of the Steering Committee of ICME in 2022 and 2023. He was also a founding member and the Chair of the EURASIP

Technical Area Committee on Visual Information Processing from 2015 to 2021. He was Editor-in-Chief of Signal Processing: Image Communication from 2010 until 2019. Since 2021, he is Specialty Chief Editor of the section on Image Processing in the journal *Frontiers in Signal Processing*.

Frederic is also on the Executive Board of Systematic Paris-Region, a European competitiveness cluster that brings together and drives an ecosystem of excellence in digital technologies and DeepTech.

His research interests include image and video coding, 3D video, high dynamic range imaging, visual quality assessment, video surveillance, privacy protection, image and video analysis, multimedia content search and retrieval, and video transmission over wireless network. He is author or co-author of 3 books, more than 200 research publications (h-index=48, 9000+ citations) and 20 patents issued or pending.

ACKNOWLEDGEMENTS

This work has received funding from the European Union Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Grant Agreement No. 765911 (RealVision) and by the ANR ReVeRy national fund (REVERY ANR-17-CE23-0020).

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

PIES-ME '22, October 14, 2022, Lisboa, Portugal

© 2022. Copyright is held by the owner/author(s).

ACM ISBN 978-1-4503-9500-7/22/10.

<https://doi.org/10.1145/3552482.3556711>