

Irina-Mihaela Ciortan

contact

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Norway

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languages

Romanian native
English proficient
Italian advanced
Spanish advanced
French medium
Norwegian
medium

programming

Matlab
Python
C#
C++

creative

GIMP & Photoshop
Midjourney
DALL-e
Deoldify
Automatic1111

objective

Research and Development of Visual Computing Technologies for Cultural Heritage Applications

professional trajectory

2023–now

NTNU, Colourlab

Gjøvik, Norway

Postdoctoral Researcher in Imaging Science

80% of my time, I work for the multidisciplinary Horizon EU Perceptive enhanced realities of colored collections through AI and virtual experiences - PERCEIVE project. My main role in the project is to design and develop scientific methods towards the color reconstruction of aged artworks. My activities include image acquisition with color and spectral imaging systems, image analysis with traditional and AI-based techniques, and creating visualization prototypes for research communication and dissemination. The rest 20% of my time, I work for the Lying Pen of Scribes project, where I use image analysis to uncover material properties and enhance the visualization of historic manuscripts.

2018–2023

NTNU, Colourlab

Gjøvik, Norway

PhD Candidate in Computer Science

My core research revolves around imaging and visual computing technologies in Cultural Heritage Applications. I mainly work with the acquisition and processing of multi-light and multi-spectral image collections towards recovering material properties.

2015–2018

University of Verona, Department of Computer Science

Verona, Italy

Research Fellow

My activity focused on improving the visual computing techniques – in particular Reflectance Transformation Imaging – for performing material annotation, characterization and classification of cultural heritage objects. This research position belongs to the Scan4Reco project (2015-2018) within the Horizon2020 programme.

2014–2015

Norwegian Color and Visual Computational Laboratory, now Colourlab

Gjøvik, Norway

Early Stage Researcher

I implemented an end-to-end workflow for Spectral Imaging and Reproduction of Paintings within a Marie Curie Research Project, Colour Printing 7.0.

2013–2014

Research & Development Department, General Magic Technologies SRL

Brasov, Romania

Image Processing Analyst

I worked in the Traffic Sign Recognition team, developing and testing image processing algorithms and machine learning techniques (detection and classification), using C++ programming language, OpenCV library and Qt framework.

2013

Hubert Curien Laboratory

Saint-Etienne, France

Research Intern

For my Master Thesis Project, I investigated the influence of color on saliency and visual attention on a large dataset of videos. I collaborated with other research laboratories and proposed a computational saliency model focused on the color attribute.

2011

IBM

Bucharest, Romania

Software Developer Intern

At the end of my Bachelor studies, I worked on a two-month internship on developing a personal contact manager application in Java.

education

2018–2023	Ph.D. in Computer Science Thesis: Spectral and Multi-light Imaging for Cultural Heritage: Material Analysis and Appearance Reconstruction. Core courses: Color Imaging, Multivariate Data Analysis, Physically based Rendering and Material Appearance Modelling	NTNU - Norwegian University of science and Technology
2011–2013	M.Sc. in Color Science Applied in Informatics and Media Technology I studied within 4 universities of Erasmus Mundus Consortium: • University Jean-Monnet, France • University of Granada, Spain • Gjøvik University College, Norway • University of Eastern Finland, Finland	
2008–2011	B.Sc. in Computer Science Thesis: Image Processing Techniques and Face Detection Technologies using the Viola-Jones Algorithm	Faculty of Economic Cybernetics, Statistics and Informatics

research projects

2017-2020	Arkwork - Archaeological Practices and Knowledge Work in the Digital Environment I was a member of the Working Group 2, dealing with the production and visualization of archaeological collections in the digital environment.	COST
2015-2018	Scan4Reco - Multimodal Scanning of Cultural Heritage Assets for their Multilayered Digitization and Preventive Conservation via Spatio-temporal 4D Reconstruction and 3D Printing Horizon 2020 As a research fellow within the Scan4Reco project, my main activities were to implement and calibrate various setups of the Reflectance Transformation Imaging technique, and to acquire, process and visualize multi-light image collections towards aging monitoring of cultural heritage objects. My collateral activities were to report the contributions aggregated to relevant work packages (WP3: Reference data collection via artificial aging of materials, WP4: Multi-sensorial and multi-spectral scanning, WP5:Spatiotemporal Simulation and Reconstruction) into official, peer-reviewed deliverables, as well as to participate to bi-annual plenary meetings with the other partners and present the work progress.	
2014-2016	Color and Space in Cultural Heritage I was the leader of a Case Study on “Digitization at the National Museum of Romanian History”, collaborating with two main partners (the museum and the Norwegian Color and Visual Computing Laboratory). In addition, I was an active member of the Spectral Object Documentation Working Group.	COST Action

awards

2019	Young Heritage Professional of Romania I was selected to be Romania's representative for the European Young Heritage Professionals Forum organized by UNESCO.	UNESCO
2017	Best Paper Award I received the best paper award as co-author of the publication “Multispectral RTI analysis of heterogeneous artworks”.	EG Workshop on Graphics and Cultural Heritage 2017
2015	Marie Curie Fellowship I received a scholarship to perform research activities on the complete end-to-end multispectral reproduction pipeline.	Norwegian Color and Visual Computing Laboratory
2012	Team Project Prize My team was awarded the 2nd place for the Project Contest on the development of a color management model for a microscope proposed by the Olympus company.	Olympus
2011	Study Scholarship I was awarded an Erasmus Mundus scholarship type B to pursue my Master studies.	Erasmus Mundus Consortium

teaching experience

2020-2022	Computer Vision @ NTNU Practical session coordinator to 2nd year bachelor students in Computer Science.	NTNU
2019-2020	Information Structures and Database Systems @ NTNU Lecturer to 2nd year bachelor students in Computer Science.	NTNU

reviewer activities

Imaging Science Journal (2024)
Visual Computer (2024)
Studies in Conservation (2023)
Pacific Graphics Conference (2023)
Heritage Science (2023)
Journal of Cultural Heritage (2022, 2024)
IET Image Processing (2021)
Journal of Electronic Imaging (2 articles in 2016 and 2019)
Journal of Computing and Cultural Heritage (1 article in 2017, 1 article in 2022)
SITIS – The 15th International Conference on Signal Image Technology & Internet based Systems (1 article in 2019)
Florence Heri-tech - The Future of Heritage Science and Technologies (2 articles in 2018 and 2022)

conference chair

I chaired the special session on Deep Learning for Cultural Heritage at the 2022 **Northern Light Deep Learning Conference**. I was also chair for the **Florence Heritech** conference in 2018.

scientific publications

- Ciortan, I. M., George, S., & Hardeberg, J. Y. (2023) **The Influence of Interreflections on Shape from Fluorescence**, IS&T Color and Imaging Conference, Paris, France
- Ciortan, I. M., Poulsson, T. G., George, S., & Hardeberg, J. Y. (2023). **Tensor Decomposition for Painting Analysis. Part 2: Spatio-temporal Simulation**. Heritage Science, 11(1), 84. <https://doi.org/10.1186/s40494-023-00913-8>
- Ciortan, I. M., Poulsson, T. G., George, S., & Hardeberg, J. Y. (2023). **Tensor Decomposition for Painting Analysis. Part 1: Pigment Characterization**. Heritage Science, 11(1), 76. <https://doi.org/10.1186/s40494-023-00910-x>
- Ciortan, I.-M., Poulsson, T. G., George, S., Hardeberg, J. Y. (2022). **Predicting Pigment Color Degradation with Time Series Models**, IS&T Color and Imaging Conference, Scottsdale, USA
- Ciortan, I.-M., Poulsson, T. G., George, S., Hardeberg, J. Y. (2022). **Spectral Classification of Paper Fixatives: A Case Study on Thomas Fearnley's Drawings** IS&T Archiving Conference, 19, 89–94. <https://doi.org/10.2352/issn.2168-3204.2022.19.1.18>
- Ciortan, I. M., Arteaga, Y., George, S., & Hardeberg, J. Y. (2022). **Multi-scale Painter Classification** In R. Furferi, L. Governi, Y. Volpe, K. Seymour, A. Pelagotti, & F. Gherardini (Eds.), The Future of Heritage Science and Technologies: ICT and Digital Heritage (pp. 150–162). Springer International Publishing. https://doi.org/10.1007/978-3-031-20302-2_12
- Ciortan, I. M., George, S., & Hardeberg, J. (2022). **Better Sensors, Better Forgers: An Adversarial Loop**. Authenticity Studies. International Journal of Archaeology and Art, 1 (Authenticity Studies, Volume 1, Issue 1), 168-193. <https://doi.org/10.14658/PUPJ-AS-2022-1-12>
- Ciortan, I. M., Giachetti, A., George, S., & Hardeberg, J. Y. (2021, June). **Fluorescence transformation imaging**. In Optics for Arts, Architecture, and Archaeology VIII (Vol. 11784, p. 1178416). International Society for Optics and Photonics.
- Ciortan, I. M., George, S., & Hardeberg, J. Y. (2021). **Colour-Balanced Edge-Guided Digital Inpainting: Applications on Artworks**. Sensors, 21(6), 2091.

- Dulecha, T., Giachetti, A., Pintus, R., Ciortan, I. M., Jaspe Villanueva, A., & Gobbetti, E. (2019). **Crack detection in single-and multi-light images of painted surfaces using convolutional neural networks**. In Eurographics Workshop on Graphics and Cultural Heritage. The Eurographics Association.
- Pintus, R., Dulecha, T. G., Ciortan, I., Gobbetti, E., & Giachetti, A. (2019, June). **Stateofheart in MultiLight Image Collections for Surface Visualization and Analysis**. In Computer Graphics Forum (Vol. 38, No. 3, pp. 909-934).
- Ciortan, Irina, Giacomo Marchioro, Claudia Daffara, Ruggero Pintus, Enrico Gobbetti, and Andrea Giachetti. **"Aging Prediction of Cultural Heritage Samples Based on Surface Microgeometry."**, Proceedings of the 16th Eurographics, Vienna 2018.
- Pintus, Ruggero, Tinsae Dulecha, Alberto Jaspe Villanueva, Andrea Giachetti, Irina Ciortan, and Enrico Gobbetti. **"Objective and Subjective Evaluation of Virtual Relighting from Reflectance Transformation Imaging Data."**, Proceedings of the 16th Eurographics Workshop on Graphics and Cultural Heritage, Vienna 2018.
- Ciortan, Irina M., T. Dulecha, A. Giachetti, R. Pintus, A. Villanueva, E. Gobbetti, **"Artworks in the spotlight: characterization with a multispectral dome"**, IOP Conference Series: Materials Science and Engineering Journal, Proceedings of The Future of Heritage Science and Technologies Conference, 2018
- Giachetti, Andrea and Irina Ciortan, Claudia Daffara, Ruggero Pintus, and Enrico Gobbetti, **"Multispectral RTI Analysis of Heterogeneous Artworks"**, Proceedings of the 15th Eurographics Workshop on Graphics and Cultural Heritage, Graz September 27-29 2017 - **Best Paper Award**, ISBN: 978-3-03868-037-6, DOI: <https://doi.org/10.2312/gch.20171288>.
- Ciortan, Irina, Ruggero Pintus, Giacomo Marchioro, Claudia Daffara, Andrea Giachetti, and Enrico Gobbetti, **"A DICOM-inspired metadata architecture for managing multimodal acquisitions in Cultural Heritage"**, Proceedings of the ITN-DCH Final Conference, Terme Olimje May 23-25 2017, ISBN:978-3-319-75825-1, DOI: https://doi.org/10.1007/978-3-319-75826-8_4.
- Ciortan, Irina M. **"Digitization of Romanian Cultural Heritage"**, Digital Techniques for Documenting and Preserving Cultural Heritage, Ed: Bentkowska-Kafel, A. and MacDonald, L. Arc Humanities Press, 2017, ISBN: ISBN: 9781942401346, DOI: <https://doi.org/10.2307/j.ctt1xp3w16>.
- Giachetti, Andrea, Irina Ciortan, Claudia Daffara, Giacomo Marchioro, Ruggero Pintus, and Enrico Gobbetti. **"A Novel Framework for Highlight Reflectance Transformation Imaging."** Computer Vision and Image Understanding (2017), DOI: <https://doi.org/10.1016/j.cviu.2017.05.014>.
- Ciortan, Irina, Ruggero Pintus, Giacomo Marchioro, Claudia Daffara, Andrea Giachetti, and Enrico Gobbetti, **"A Practical Reflectance Transformation Imaging Pipeline for Surface Characterization in Cultural Heritage"**, Proceedings of the 14th Eurographics Workshop on Graphics and Cultural Heritage, Genova October 5-7 2016, pp. 127-136, ISBN: 978-3-03868-011-6, DOI: <https://doi.org/10.2312/gch.20161396>.
- Pintus, R., Ciortan, I., Giachetti, A. and Gobbetti, E., 2016. **Practical Free-form RTI Acquisition with Local Spot Lights**, Smart Tools and Apps for Graphics - Eurographics Italian Chapter Conference, Genova October 3-4 2016, pp. 143-150, ISBN: 978-3-03868-026-0, DOI: <https://doi.org/10.2312/stag.20161374>
- Fabio Marco Caputo, Irina Mihaela Ciortan, Davide Corsi, Marco De Stefani and Andrea Giachetti, **"Gestural Interaction and Navigation Techniques for Virtual Museum Experiences"**, Workshop on Advanced Visual Interfaces for Cultural Heritage, 2016
- Ciortan, Irina M. , **"Color Image Processing for Mother-of-Pearl Clouds"**, Proceedings of the International Conference on Light and Color in Nature 2016 - Oral presentation held on 1st of June 2016
- Slavuj, Radovan, Ludovic G. Coppel, Irina Ciortan, Peter Nussbaum, and Jon Yngve Hardeberg, **"Modeling and halftoning for multichannel printers: A spectral approach"**, Journal of Print and Media Technology Research in October, 2015.
- Ciortan I., H. Deborah, S. George and J. Y. Hardeberg, **"Color and hyperspectral image segmentation for historical documents"**, 2015 Digital Heritage, Granada, 2015, pp. 199-206.
- Sony George, Irina M. Ciortan, Jon Yngve Hardeberg, **"Evaluation of Hyperspectral Imaging Systems for Cultural Heritage Applications based on a Round Robin Test"**, Oral presentation at the 16th International Symposium on Multispectral Color Science within AIC Congress 2015.
- Ciortan, Irina M., Eric Dinet, and Alain Trémeau. **"Influence of color on visual saliency in short videos."** In Image Processing (ICIP), 2014 IEEE International Conference on, pp. 1160-1164. IEEE, 2014.

Panagios Alexandros Bokaris, Oriel Frigo, Ailin Chen, Irina M. Ciortan and Antonio Pelegrina, **“Basic and advanced colorimetry methods for displaying microscope image appearance”** , Poster Session at the 12th International AIC Congress, 2013.