Curriculum Vitae

Personal Information

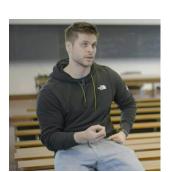|	
Name	Fabio Tosi, PhD
Date of Birth	*October 3rd, 1992*
Citizenship	*Italian*
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Email	fabio.tosi5@unibo.it (primary)
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Website	https://fabiotosi92.github.io/
Code	https://github.com/fabiotosi92
Google Scholar	https://scholar.google.com/citations?user=5-UOaQkAAAAJ&hl=it
ResearchGate	https://www.researchgate.net/profile/Fabio_Tosi
Scopus	https://www.scopus.com/authid/detail.uri?authorId=57195938366
Semantic Scholar	https://www.semanticscholar.org/author/F.-Tosi/121670758
DBLP	https://dblp.org/pid/205/3975.html
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ASN (09/H1, II Fascia)	https://asn21.cineca.it/pubblico/miur/esito/09%252FH1/2/4

Research Area and Expertises

Keywords	Machine Learning, Deep Learning, Computer Vision and 3D sensing, Image Processing
Research Themes	As a researcher in computer vision and deep learning, I have dedicated my work to developing advanced methods for 3D reconstruction, focusing on both stereo and monocular image processing. My research also includes depth uncertainty estimation through deep learning and the use of multi-spectral image matching techniques. More recently, I have explored neural radiance fields to tackle complex problems in 3D reconstruction, SLAM, and image processing.

Education

03/2020-11/2020	**Visiting Ph.D.** student (https://avg.is.mpg.de/person/ftosi) @ *Max Planck Institute for Intelligent System and University of Tübingen* - Autonomous Vision Group *(Tübingen, Germany)* Topic: *"Active Multi-view Stereo"* Supervisor: Prof. Dr.-Ing. Andreas Geiger
2017 – 2020	**Ph.D.** in Computer Science and Engineering *(Bologna, Italy)* *Commission Judgment: Excellent (5.0/5.0)* PhD Thesis: *"Deep-learning for 3D reconstruction"* approved after examination by Dr. Sean Ryan Fanello and Prof. Seungryong Kim Thesis available at: http://amsdottorato.unibo.it/9816/ **Best PhD Thesis Award**, Italian Association for Computer Vision Research (**CVPL 2022**) Supervisor: Prof. Stefano Mattoccia
2014 – 2017	**Master Degree** in Computer Science and Engineering *(Bologna, Italy)* *110L/110 - Magna cum Laude* Thesis: *"Confidence measures and depth map refinement algorithms"* Advisors: Prof. Stefano Mattoccia, Dr. Matteo Poggi
2011 – 2014	**Bachelor Degree** in Computer Science and Engineering *(Bologna, Italy)* Thesis: *"Refinement techniques for depth data generated by a stereo vision system"* Supervisor: Prof. Stefano Mattoccia

Academic Position

2023 - Present	**Junior Assistant Professor (RTDA)** @ Department of Computer Science and Engineering (DISI), University of Bologna (Bologna, Italy)
2021 – 2023	**Postdoctoral Researcher** @ Department of Computer Science and Engineering (DISI), University of Bologna (Bologna, Italy)
2017 – 2021	**PhD Student** @ Department of Computer Science and Engineering (DISI), University of Bologna (Bologna, Italy)

Academic Qualifications

2023	**Italian National Scientific Qualification (ASN)** – Associate Professor (09/H1, Sector: Information Processing Systems, II Level)

Memberships Of Scientific Societies

2022-Present	**CVPL Member**, Italian Association for Computer Vision Research (CVPL)
2017-Present	**IEEE Member**, Institute of Electrical and Electronics Engineers (IEEE)

Institutional Responsibilities

2023-Present	**PhD Co-Supervisor**, (1 PhD Student), University of Bologna
2021	**Principal Investigator (PI)**, Proof of Concept d'Ateneo, PoC UNIBO 3rd edition
2017 - 2023	**Student Co-Supervisor**, (>13 students), University of Bologna, (non-exhaustive list)

Editorial Duties

2024-Present	**Associate Editor**, Pattern Recognition (Elsevier) (https://www.sciencedirect.com/journal/pattern-recognition/about/editorial-board) - Impact Factor: 7.5, Citation Score: 14.4

Research Projects & Fellowship

03/2023 – 10/2023	**Postdoctoral Researcher** @ Department of Computer Science and Engineering (DISI), University of Bologna (Bologna, Italy)

Fund Manager & Supervisor: Stefano Mattoccia

Research Topic: The proposed research aims to develop deep learning-based methodologies for 3D scene reconstruction from one or multiple images using active sensors such as time-of-flight or LIDAR. The study addresses the limitations associated with estimating depth from non-Lambertian surfaces, thin objects, and high-resolution images. The research also focuses on developing techniques that can be executed on low-power and mobile devices. In addition, the study investigates methods for training proposed networks that do not require depth annotations, which are expensive to obtain, and preferably self-supervised.

Work Plan:
- Preliminary study of literature and identification of critical issues related to the problem to be solved.
- Definition of the most suitable hardware and software architectures for the research activity outlined.
- Implementation and validation of proposed methodologies on well-known datasets in literature with or without the use of active sensors.
- Development of a validation prototype to perform field tests with data acquired from cameras and suitable sensors.

02/2022 – 02/2023	**Postdoctoral Researcher** @ Department of Computer Science and Engineering (DISI), University of Bologna (Bologna, Italy) - **Principal Investigator (PI)**

Funding: PoC UNIBO 3rd edition

Role: Principal Investigator (PI)

Fund Manager: Dr. Matteo Poggi

Research Topic: Development and validation of patented technology for adapting a neural network capable of estimating depth from stereo images to unknown and very different environments. Implementation on high-end GPU-equipped desktop PCs and study of real-time execution from a theoretical point of view. Aim to create a functioning prototype and advance to a TRL of at least 6. Explore possible upgrades to the technology, such as increasing the robustness and accuracy of the depth estimation process in challenging conditions or integrating the technology with other sensors or systems.

Objectives:
○ Develop a functioning prototype
○ Advance to a TRL of at least 6
○ Explore upgrades to the technology

Expected Outcomes: Functioning prototype, advancement to a TRL of at least 6, exploration of technology upgrades.

02/2021 – 02/2022 **Postdoctoral Researcher** @ "Department of Computer Science and Engineering (DISI)" *(Bologna, Italy)*

Funding: Huawei Technologies Co. Ltd.

Advisors: Prof. L. Di Stefano, Prof. S. Mattoccia, Dr. M. Poggi, Prof. S. Salti

Collaborator: Dr. Pierluigi Zama Ramirez

Research Topic: Developed a new core technology for accurately registering two images captured by different modalities, such as an RGB and a multi-spectral (MS) sensor, using self-supervised deep learning techniques. The technology estimated the optical flow field between the images by finding a 2D vector field that mapped pixels from one image to the corresponding pixels in the other.

Scientific Deliverables: The following is a list of the scientific deliverables produced in the project. These deliverables include flow estimation methods for different sensor combinations, a live demo of flow estimation, a feasibility study report, an on-line adaptive flow estimation method, evaluation methodologies and acquisition setup definition, a large annotated dataset with ground truth, and a protocol for evaluating the performance of developed methodologies:

○ D.1.1: Flow estimation method for heterogeneous RGB sensors
○ D.1.2: Flow estimation method for an RGB and a multi-spectral (MS) camera
○ D.1.3: Live demo of flow estimation from heterogeneous RGB sensors
○ D.1.4: Feasibility study report on flow estimation from RGB and event-based cameras
○ D.1.5: On-line adaptive flow estimation method from an RGB camera and a MS sensor
○ D.2.1: Evaluation methodologies and acquisition setup definition
○ D.2.2: Large annotated dataset with ground truth
○ D.2.3: Protocol for evaluating performance of developed methodologies

Papers and Code: In this project, a total of 4 papers were published at the CVPR and 3DV conferences. One of these papers received the best honorable mention award at the 3DV 2021 conference. The associated code for these papers is available at the following links:

○ https://cvlab-unibo.github.io/booster-web/
○ https://cvlab-unibo.github.io/rgb-ms-web/
○ https://github.com/CVLAB-Unibo/neural-disparity-refinement
○ https://cvlab-unibo.github.io/xnerf-web/

04/2017 – 11/2017 **Research Fellow** @ "Building and Construction Interdepartmental Center for Industrial Research" *(Bologna, Italy)*

Advisors: Prof. Elena Toth, Prof. Stefano Mattoccia

Research Topic: Developed and evaluated a novel optical flow scheme for camera-based surface flow velocity estimation. Compared performance to traditional techniques and evaluated sensitivity to various factors. Investigated potential for real-time gauge-cam implementations.

Objectives:
- Develop and implement the OTV algorithm
- Compare performance to traditional techniques
- Evaluate sensitivity to various factors
- Investigate potential for real-time gauge-cam implementations

Methodology: Implementation, data acquisition and analysis, performance comparison, sensitivity evaluation, feasibility exploration.

Papers and Code: In this project, a total of 3 papers were published at Remote Sensing and Applied Sciences jounals. The associated code for these papers is available at the following link:
- https://github.com/fabiotosi92/Optical-Tracking-Velocimetry

Note: The contract was interrupted before its natural conclusion as incompatible with the Ph.D. grant.

2013 – 2014   **Internship** @ University of Bologna *(Bologna, Italy)*
Topic: "Stereo Vision: Algorithms and Applications"
Supervisor: Prof. Stefano Mattoccia

Teaching Activities

2024 - Present   **Junior Assistant Professor**, Digital Systems M (Module 2 - GPU Architectures and CUDA C Programming) @ Department of Computer Science and Engineering (DISI), University of Bologna (Bologna, Italy) (https://www.unibo.it/en/study/phd-professional-masters-specialisation-schools-and-other-programmes/course-unit-catalogue/course-unit/2024/468006)

2023 - Present   **Junior Assistant Professor**, Fundamentals of Computer Science (Module 2) @ Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" (Bologna) (https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2022/472922)

2021 - 2023   **Adjunct Professor**, Fundamentals of Computer Science (Module 2) @ Department of Electrical, Electronic, and Information Engineering "Guglielmo Marconi" (Bologna) (https://www.unibo.it/it/didattica/insegnamenti/insegnamento/2022/472922)

2023   **PhD Course Teacher**, *"Deep Scene Understanding from Images for Monitoring Applications"*, PhD course in Engineering and Information Technology for Structural and Environmental Monitoring and Risk Management – EIT4SEMM, University of Bologna (Bologna, Italy) with Dr. Matteo Poggi and Dr. Pierluigi Zama Ramirez, July 2023, 20 hours. (https://cvlab-unibo.github.io/deep_scene_understanding_from_images_for_monitoring_applications/)

2022   **PhD Course Teacher**, *"Deep Scene Understanding From Images"*, PhD course in Computer Science and Engineering, University of Bologna (Bologna, Italy) with Dr. Matteo Poggi and Dr. Pierluigi Zama Ramirez, May 2022, 20 hours. (https://cvlab-unibo.github.io/deep_scene_understanding_from_images/)

2019   **2nd Level Master Course**, *"Depth sensing technologies for autonomous vehicles"*, Master in Sustainable and Integrated Mobility In Urban Regions, University of Bologna, Imola (Bologna)

2019 – 2020   **Teaching Assistant**, "Computer architectures T - Computer Science and Engineering", @ University of Bologna *(Bologna, Italy)* with Prof. Stefano Mattoccia, ~ 150 students

2017 – 2018   **Teaching Assistant**, "Logic Design T - Computer Science and Engineering", @ University of Bologna *(Bologna, Italy)* with Prof. Stefano Mattoccia and Prof. Alfredo D'Elia, ~ 150 students.

Grants

2022   **Intellectual Property Award**, IPA 2021 (10.000 €)

At the Intellectual Property Award (IPA) event held at the Dubai Expo, our technology named "Method for determining the confidence of a disparity map through a self-adaptive learning of a neural network, and sensor system thereof" was recognized by the commission for its potential to address a significant challenge in the field of assisted and autonomous driving systems - namely, the accuracy of machine learning algorithms. Additionally, the proposed solution has the potential to be applied to a wider range of uses in the field of artificial vision systems, such as object recognition and tracking in dynamic environments. The IPA was organized by the Ministry of Economic Development and featured ideas from universities and public entities across Italy, including the University of Bologna. It was held in seven technological areas, including Agritech and Agrifood, Cybersecurity, Artificial Intelligence and Big Data, and Future mobility.

2021 **Proof of Concept d'Ateneo**, PoC UNIBO 3rd edition (38.900 €)

I was selected as the Principal Investigator (PI) for a project entitled "*Depth determination method based on images, self-adaptive neural networks, and relative system*". It was accepted among the first 7 funded by the University's Proof of Concept (POC) program, which seeks to promote the commercial viability of technologies developed in university research laboratories and facilitate their progression through the development, technical validation, and commercial validation stages. I was awarded a grant of 38,900 Euros to support the further development and validation of this innovative technology, which has the potential to address a significant challenge in the field of assisted and autonomous driving systems.

Acknowledgements & Awards

2024 **Best Poster Award** to our work *"Self-Evolving Depth-Supervised 3D Gaussian Splatting from Rendered Stereo Pairs"* - British Machine Vision Conference (**BMVC 2024, A GRIN Rank**)

2024 **Outstanding Reviewer** - European Conference on Computer Vision (**ECCV 2024**, A++ GRIN Rank) (https://eccv.ecva.net/Conferences/2024/Reviewers#all-outstanding-reviewers)

2024 **Outstanding Reviewer** - Computer Vision and Pattern Recognition (**CVPR 2024**, A++ GRIN Rank) (https://cvpr2023.thecvf.com/Conferences/2024/OutstandingReviewers)

2023 **Outstanding Reviewer** - Computer Vision and Pattern Recognition (**CVPR 2023**, A++ GRIN Rank) (https://cvpr2023.thecvf.com/Conferences/2023/OutstandingReviewers)

2023 **Emergency Reviewer**
   ○ International Conference on Computer Vision (**ICCV 2023**)
   ○ International Conference on 3D Vision (**3DV 2024**)
   ○ Computer Vision and Pattern Recognition (**CVPR 2024**)

2022 **Best PhD Thesis Award**, Italian Association for Computer Vision Research (**CVPL 2022**) (https://www.cvpl.it/en/awards/#miglior_tesi_dottorato)

2021 **Category Winner**, Intellectual Property Award for Future Mobility (**IPA 2021**) for our invention *"Self-confident: online learning for detecting depth sensor failures"* (https://uibm.mise.gov.it/images/DOSSIER.pdf)

2021 **Best Paper Honorable Mention** to our work *"Neural Disparity Refinement for Arbitrary Resolution Stereo"* - International Conference on 3D Vision (**3DV 2021**) (https://3dv2021.surrey.ac.uk/prizes/)

2021 **Emergency Reviewer** - TradiCV (in conjunction with ICCV 2021) (https://sites.google.com/view/tradicv/committee)

2021 **Outstanding Reviewer** - International Conference on Computer Vision (**ICCV 2021**, A++ GRIN Rank) (https://iccv2021.thecvf.com/outstanding-reviewers)

2020 **Outstanding Reviewer** - European Conference on Computer Vision (**ECCV 2020**, A++ GRIN Rank) (https://eccv2020.eu/outstanding-reviewers/)

Skills & Background Knowledge

Languages	Italian, *Mothertongue*
	English, *B2 certificate*
Programming languages	C, C++, C#, CUDA C, Java, Python, Lua, Scala, Prolog, VHDL, LateX
CV and ML frameworks	OpenCV, Tensorflow, PyTorch
Development	VS, VS Code, Git

Organization of Workshops & Tutorials

Workshops

[W6] *"NeuSLAM 2024: 1st Dense Neural SLAM Workshop"*, **ECCV 2024** (Milano, IT) [https://sites.google.com/view/neuslam] - **Role:** Organizer

[W5] *"TradiCV 2024: 2nd Workshop on Traditional Computer Vision in the Age of Deep Learning (TradiCV)"*, **ECCV 2024** (Milano, IT) [https://sites.google.com/view/tradicv] - **Role:** Organizer

[W4] *"TRICKY 2024: Transparent & Reflective objects In the Wild Challenges"*, **ECCV 2024** (Milano, IT) [https://sites.google.com/view/eccv24-tricky-workshop/] - **Role:** Organizer

[W3] *"NTIRE 2024: 9th New Trends in Image Restoration and Enhancement Workshop and Challenges"*, **CVPR 2024** (Seattle, US) [https://cvlab-unibo.github.io/booster-web/ntire][https://cvlai.net/ntire/2024/] - **Role:** Organizer

Track 1 - HR Depth from Images of Specular and Transparent Surfaces - Stereo [https://codalab.lisn.upsaclay.fr/competitions/17515]

Track 2 - HR Depth from Images of Specular and Transparent Surfaces - Mono [https://codalab.lisn.upsaclay.fr/competitions/17516]

[W2] *"MDEC - (3rd) Monocular Depth Estimation Challenge"*, **CVPR 2024** (Seattle, WA, United States) [https://jspenmar.github.io/MDEC/] - **Role:** Organizer

[W1] *"NTIRE 2023: 8th New Trends in Image Restoration and Enhancement Workshop and Challenges"*, **CVPR 2023** (Vancouver, Washington) [https://cvlab-unibo.github.io/booster-web/ntire][https://cvlai.net/ntire/2023/] - **Role:** Organizer

Track 1 - HR Depth from Images of Specular and Transparent Surfaces - Stereo [https://codalab.lisn.upsaclay.fr/competitions/10494]

Track 2 - HR Depth from Images of Specular and Transparent Surfaces - Mono [https://codalab.lisn.upsaclay.fr/competitions/10502]

Tutorials

[T5] M. Poggi, **F. Tosi**, *"Deep Stereo Matching in the Twenties"*, **CVPR 2024** (Seattle, Washington, US) [https://sites.google.com/view/stereo-twenties] - **Role:** Organizer

[T4] M. Poggi, **F. Tosi**, F. Aleotti, K. Batsos, P. Mordohai, S. Mattoccia, *"Facing depth estimation in-the-wild with deep networks"*, **ECCV 2020** (SEC, Glasgow) [https://sites.google.com/view/eccv-2020-robust-depth/home] - **Role:** Organizer

[T3] M. Poggi, **F. Tosi**, F. Aleotti, S. Mattoccia, C. Godard, J. Watson, M. Firman, G. J. Brostow, *"Learning and understanding single image depth estimation in the wild"*, **CVPR 2020** (Seattle, Washington, US) [https://sites.google.com/view/cvpr-2020-depth-from-mono/home] - **Role:** Organizer

[T2] M. Poggi, **F. Tosi**, K. Batsos, P. Mordohai, S. Mattoccia, *"Learning - based depth estimation from stereo and monocular images: successes, limitations and future challenges"*, **CVPR 2019** (Long Beach, California, US)[https://sites.google.com/view/cvpr-2019-depth-from-image/home] - **Role:** Organizer

[T1] M. Poggi, **F. Tosi**, K. Batsos, P. Mordohai, S. Mattoccia, *"Learning-based depth estimation from stereo and monocular images: successes, limitations and future challenges"*, **3DV 2018** (Verona, Italy) [https://sites.google.com/view/3dv-2018-depth-from-image/home] - **Role:** Organizer

Live Demonstrations

[I7] L. Bartolomei, M. Poggi, **F. Tosi**, A. Conti, S. Mattoccia, *"Multi-Setup Depth Perception through Virtual Image Hallucination"*, **ECCV 2024** (Milan, IT) [https://eventvppstereo.github.io/demo.html] - **Role:** Organizer

[I6] L. Bartolomei, M. Poggi, **F. Tosi**, A. Conti, S. Mattoccia, *"Robust depth perception through Virtual Pattern Projection"*, **CVPR 2024** (Seattle, US) [https://github.com/bartn8/cvpr24-demo/?tab=readme-ov-file] - **Role:** Organizer

[I5] A. Tonioni, **F. Tosi**, M. Poggi, S. Mattoccia, L. Di Stefano, *"Real-Time self-adaptive deep stereo"*, **CVPR 2019** (Long Beach, California, US) - **Role:** Organizer

[I4] M. Poggi, **F. Tosi**, F. Aleotti, S. Mattoccia, *"Real-Time monocular depth estimation without GPU"*, **CVPR 2019** (Long Beach, California, US) - **Role:** Organizer

[I3] V. Peluso, A. Cipolletta, A. Calimera, M. Poggi, **F. Tosi**, S. Mattoccia, *"Energy - Efficient Monocular Depth Estimation on ARM - based Embedded Platforms"*, U-boot at **DATE 2019** (Firenze, Italy) - **Role:** Organizer

[I2] M. Poggi, **F. Tosi**, S. Mattoccia, *"Towards real-time monocular and unsupervised depth estimation on CPU"*, **3DV 2018** (Verona, Italy) - **Role:** Organizer

[I1] M. Poggi, **F. Tosi**, S. Mattoccia, *"Towards real-time learning of monocular depth estimation enabling multiple view synthesis on CPU"*, **ECCV 2018** (Munich, Germany) - **Role:** Organizer

Patents

[B5] L. Bartolomei, M. Poggi, **F. Tosi**, S. Mattoccia, *"Apparato di elaborazione di immagini, corrispondente procedimento e prodotto informatico"*, pending (102023000014727, July 7, 2023)

[B4] M. Poggi, F. Aleotti, **F. Tosi**, S. Mattoccia, V. Peluso, A. Cipolletta, A. Calimera, *"Method for determining the depth from a single image and system thereof"*, pending (102021000007175, March 24, 2021)

[B3] M. Poggi, F. Aleotti, **F. Tosi**, S. Mattoccia, *"Method for determining the confidence of a disparity map through a self-adaptive learning of a neural network, and sensor system thereof"*, pending (102020000016054, July 2, 2020), **Intellectual Property Award**

[B2] A. Tonioni, **F.Tosi**, M. Poggi, S. Mattoccia, L. Di Stefano, *"Depth determination method based on images, self-adaptive neural networks, and relative system" (Real-Time Self Adaptive Deep Stereo)*, pending (2019)

[B1] M. Poggi, D. Pallotti, **F. Tosi**, S. Mattoccia, *"Depth determination method based on images, and relative system" (Guided Stereo Matching)*, - pending (102019000006964, March 23, 2021) - a research project funded by University of Bologna, PoC UNIBO 2nd edition

Full Publication List

All publications are peer-reviewed conference or journal publications and top tier in the respective field. **ICCV**, **ECCV** and **CVPR** are highly competitive with acceptance rates of less than 30%. **CVPR** and **TPAMI** are the most highly cited IEEE conference (https://research.com/conference-rankings/computer-science) and journal (https://research.com/journals-rankings/computer-science) with the highest impact in Engineering and Computer Science. **CVPR**, **ECCV** and **ICCV** are among the four most impactful conferences in all of computer science. †indicates *Joint first authorship.*

Citation Indices   *Number of Citations:* 3175 (Google Scholar), 1857 (Scopus), 2998 (ResearchGate)

i10-Index: 41 (Google Scholar)

h-Index: 27 (Google Scholar), 20 (Scopus)

Accessed: 14.12.2024

Proceedings

[P42] U. Cavalcanti, M. Poggi, **F. Tosi**, V. Cambareri, V. Zlokolica, S. Mattoccia, *"CabNIR: A Benchmark for In-Vehicle Infrared Monocular Depth Estimation"*, IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), Tucson, Arizona, US, Feb 28 – Mar 4, 2024

[P41] S. Safadoust, **F. Tosi**, F. Guney, M. Poggi, *"Self-Evolving Depth-Supervised 3D Gaussian Splatting from Rendered Stereo Pairs"*, 35th British Machine Vision Conference (**BMVC**, A GRIN Rank), Glasgow, UK, November 25-28, 2024 (**Best Poster Award**)

[P40] **F. Tosi**, P. Zama Ramirez, M. Poggi, *"Diffusion Models for Monocular Depth Estimation: Overcoming Challenging Conditions"*, European Conference on Computer Vision (**ECCV**, A++ GRIN Rank), Milan, Italy, 2024

[P39] M. Poggi, **F. Tosi**, *"Federated Online Adaptation for Deep Stereo"*, IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**, A++ GRIN Rank), Seattle, US, 2024

[P38] L. Bartolomei, M. Poggi, A. Conti, **F. Tosi**, S. Mattoccia, *"Revisiting Depth Completion from a Stereo Matching Perspective for Cross-domain Generalization"*, 2024 International Conference on 3D Vision (**3DV**, A- GRIN Rank), Davos, Switzerland, 2024, pp. 1360-1370, https://doi.org/10.1109/3DV62453.2024.00127

[P37] Y. Zhang, **F. Tosi**, S. Mattoccia, M. Poggi, *"GO-SLAM: Global Optimization for Consistent 3D Instant Reconstruction"* 2023 IEEE/CVF International Conference on Computer Vision (**ICCV**, A++ GRIN Rank), Paris, France, 2023, pp. 3704-3714, , Paris, France, October 4-6, 2023, https://doi.org/10.1109/ICCV51070.2023.00345

[P36] L. Bartolomei, M. Poggi, **F. Tosi**, A. Conti, S. Mattoccia, *"Active Stereo Without Pattern Projector"* 2023 IEEE/CVF International Conference on Computer Vision (**ICCV**, A++ GRIN Rank), Paris, France, 2023, pp. 18424-18436, https://doi.org/10.1109/ICCV51070.2023.01693

[P35] C. Zhao, M. Poggi, **F. Tosi**, l. Zhou, Q. Sun, Y. Tang, S. Mattoccia, *"GasMono: Geometry-Aided Self-Supervised Monocular Depth Estimation for Indoor Scenes"* 2023 IEEE/CVF International Conference on Computer Vision (**ICCV**, A++ GRIN Rank), Paris, France, 2023, pp. 16163-16174, https://doi.org/10.1109/ICCV51070.2023.01485

[P34] A. Costanzino[†], P. Zama Ramirez[†], M. Poggi[†], **F. Tosi**, S. Mattoccia, L. Di Stefano, *"Learning Depth Estimation for Transparent and Mirror Surfaces"* 2023 IEEE/CVF International Conference on Computer Vision (**ICCV**, A++ GRIN Rank), Paris, France, 2023, pp. 9210-9221, 10.1109/ICCV51070.2023.00848

[P33] **F. Tosi**, A. Tonioni, D. De Gregorio, M. Poggi, *"NeRF-Supervised Deep Stereo"* 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**, A++ GRIN Rank), Vancouver, BC, Canada, 2023, pp. 855-866, https://doi.org/10.1109/CVPR52729.2023.00089

[P32] P. Zama Ramirez, **F. Tosi**, L. Di Stefano, R. Timofte, *"NTIRE 2023 Challenge on HR Depth from Images of Specular and Transparent Surfaces"*, 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (**CVPRW**), Vancouver, BC, Canada, 2023, pp. 1384-1395, https://10.1109/CVPRW59228.2023.00143

[P31] R. Fan, **F. Tosi**, M. Poggi, S. Mattoccia, *"Lightweight Self-Supervised Depth Estimation with few-beams LiDAR Data"*, 34th British Machine Vision Conference (**BMVC**, A GRIN Rank), Aberdeen, UK, November 20-24, 2023

[P30] H. Li, M. Poggi, **F. Tosi**, S. Mattoccia, *"On-Site Adaptation for Monocular Depth Estimation with a Static Camera"*, 34th British Machine Vision Conference (**BMVC**, A GRIN Rank), Aberdeen, UK, November 20-24, 2023 (**ORAL**)

[P29] J. Spencer, C. Stella Qian, M. Trescakova, C. Russell, S. Hadfield, E. W. Graf, W. J. Adams, A. J. Schofield, J. Elder, R. Bowden, A. Anwar, H. Chen, X. Chen, K. Cheng, Y. Dai, H. T. Hoa, S. Hossain, J. Huang, M. Jing, B. Li, C. Li, B. Li, Z. Liu, S. Mattoccia, S. Mercelis, M. Nam, M. Poggi, X. Qi, J. Ren, Y. Tang, **F. Tosi**, L. Trinh, S. M. N. Uddin, K. M. Umair, K. Wang, Y. Wang, Y. Wang, M. Xiang, G. Xu, W. Yin, J. Yu, Q. Zhang, C. Zhao, *"The Second Monocular Depth Estimation Challenge"*, 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (**CVPRW**), Vancouver, BC, Canada, 2023, pp. 3064-3076, https://10.1109/CVPRW59228.2023.00308.

[P28] J. Spencer, C. S. Qian, C. Russell, S. Hadfield, E. Graf, W. Adams, A. J. Schofield, J. Elder, R. Bowden, H. Cong, S. Mattoccia, M. Poggi, Z. K. Suri, Y. Tang, **F. Tosi**, H. Wang, Y. Zhang, Y. Zhang, C. Zhao, "*The Monocular Depth Estimation Challenge*", at IEEE Winter Conference on Applications of Computer Vision Workshops (**WACVW 2023**), DOIR:10.1109/WACVW58289.2023.00069

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[P25] M. Poggi✝, P. Zama Ramirez[†], **F. Tosi**[†], S. Salti, L. Di Stefano, S. Mattoccia, *"Cross-Spectral Neural Radiance Fields"*, at the International Conference on 3D Vision (**3DV**), Prague, Czech Republic, 2022, pp. 668-678, https://doi.org/10.1109/3DV57658.2022.00071

[P24] Chaoqiang Zhao, Youmin Zhang, M. Poggi, **F. Tosi**, Xianda Guo, Zheng Zhu, Guan Huang, Yang Tang, S. Mattoccia, *"MonoViT: Self-Supervised Monocular Depth Estimation with a Vision Transformer"*, at the International Conference on 3D Vision (**3DV**), Prague, Czech Republic, 2022, pp. 668-678, https://doi.org/10.1109/3DV57658.2022.00077

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[P22] **F. Tosi**, Y. Liao, C. Schmitt, A. Geiger, "SMD-Nets: Stereo Mixture Density Networks", 2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**, A++ GRIN Rank), 2021, pp. 8938-8948, https://doi.org/10.1109/CVPR46437.2021.00883 - featured in the BEST OF CVPR of Computer Vision News.

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[P3] **F. Tosi**, M. Poggi, A.Tonioni, L. Di Stefano, S. Mattoccia, *"Learning confidence measures in the wild"*, In T.K. Kim, S. Zafeiriou, G. Brostow and K. Mikolajczyk, editors, Proceedings of the British Machine Vision Conference (**BMVC**, A GRIN Rank), pages 133.1-133.13. BMVA Press, September 2017, https://doi.org/10.5244/C.31.133

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[J18] **F. Tosi**, L. Bartolomei, M. Poggi, *"A Survey on Deep Stereo Matching in the Twenties"*, in International Journal of Computer Vision, 2024.

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[J15] **F. Tosi**, F. Aleotti, P. Zama Ramirez, M. Poggi, S. Mattoccia and L. D. Stefano, *"Neural Disparity Refinement"* in IEEE Transactions on Pattern Analysis and Machine Intelligence, 2024, https://doi.org/10.1109/TPAMI.2024.3411292.

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[J6] F. Aleotti, G. Zaccaroni, L. Bartolomei, M. Poggi, **F. Tosi**, S. Mattoccia, *"Real-time single image depth perception in the wild with handheld devices"*, MDPI Sensors (https://doi.org/10.3390/s21010015) (IF:3.576)

[J5] M. Poggi, **F. Tosi**, S. Mattoccia, *"Learning a confidence measure in the disparity domain from O(1) features"*, Computer Vision and Image Understanding (CVIU) (https://doi.org/10.1016/j.cviu.2020.102905) (IF:4.886)

[J4] M. Poggi, G. Agresti, **F. Tosi**, P. Zanuttigh, S. Mattoccia, *"Confidence Estimation for ToF and Stereo Sensors and Its Application to Depth Data Fusion"* in IEEE Sensors Journal, vol. 20, no. 3, pp. 1411-1421, 1 Feb.1, 2020, https://doi.org/10.1109/JSEN.2019.2946591.

[J3]   M. Poggi, **F. Tosi**, S. Mattoccia, *"Good Cues to Learn From Scratch a Confidence Measure for Passive Depth Sensors"* in IEEE Sensors Journal, vol. 20, no. 22, pp. 13533-13541, 15 Nov.15, 2020, https://doi.org/10.1109/JSEN.2020.3004629.

[J2]   **F. Tosi**, M. Rocca, F. Aleotti, M. Poggi, S. Mattoccia, F. Tauro, E. Toth, S. Grimaldi, *"Enabling Image-Based Streamflow Monitoring at the Edge"* Remote Sensing 12, no. 12: 2047. https://doi.org/10.3390/rs12122047.

[J1]   F. Tauro, **F. Tosi**, S. Mattoccia, E. Toth, R. Piscopia, S. Grimaldi, *"Optical Tracking Velocimetry (OTV): Leveraging Optical Flow and Trajectory-Based Filtering for Surface Streamflow Observations"* Remote Sensing 10, no. 12: 2010. https://doi.org/10.3390/rs10122010.

Pre-Prints

[PP3]   L. Bartolomei, **F. Tosi**, M. Poggi, S. Mattoccia *"Stereo Anywhere: Robust Zero-Shot Deep Stereo Matching Even Where Either Stereo or Mono Fail"*, arXiv (pre-print) 2024, (https://arxiv.org/pdf/2412.04472).

[PP2]   L. Bartolomei, M. Poggi, **F. Tosi**, A. Conti, S. Mattoccia *"Stereo-Depth Fusion through Virtual Pattern Projection"*, arXiv (pre-print) 2024, (https://arxiv.org/pdf/2406.04345).

[PP1]   **F. Tosi**, Y. Zhang, Z. Gong, E. Sandström, S. Mattoccia, M. R. Oswald, M. Poggi, *"How NeRFs and 3D Gaussian Splatting are Reshaping SLAM: a Survey"*, arXiv (pre-print) 2024, (https://arxiv.org/pdf/2402.13255.pdf).

Other Pubblications   S. Mattoccia, M. Poggi, **F. Tosi**, F. Aleotti, *"Deep learning e Computer vision: le tecnologie abilitanti del 3D"*, Sistemi&Impresa, ESTE - Edizioni Scientifiche Tecniche Europee Srl, pag 62-65, Febbraio 2020.

Past and Ongoing Collaborations

Companies	**Google Zurich** – Switzerland (Dr. Alessio Tonioni)	*publications*
	Huawei – Finland (Jussi Yli-Äyhö)	*research project*
	Sony Depthsensing Solution – Belgium (Dr. Valerio Cambareri)	*research project*
	Eyecan.ai – Italy (Dr. Daniele De Gregorio)	*publications*
	Niantic – UK (Gabriel J. Brostow, Michael Firman)	*tutorial*
	Oxa – UK (Jaime Spencer)	*workshop organization*
	Blue River Technology – US (Ripudaman Singh Arora)	*workshop organization*
Universities	**Autonomous Vision Group (AVG)** – Germany (Prof. Andreas Geiger)	*publication, visiting*
	ETH – Switzerland (Prof. Radu Timofte)	*workshop organization*
	ETH – Switzerland (Erik Sandström)	*research project*
	University of Amsterdam – NL (Martin R. Oswald)	*research project*
	Koc University – Turkey (Asst. Prof. Fatma Güney)	*research project*
	Korea University – South Korea (Prof. Seungryong Kim)	*publications*
	Stevens Institute of Technology – US (Prof. Philippos Mordohai)	*tutorials, publications*
	Oxford Internet Institute – UK (Chris Russell)	*workshop organization*
	Zhejiang University – China (Yiyi Liao)	*publication, workshop organization*
	University of Surrey – UK (Simon Hadfield, Richard Bowden)	*workshop organization*
	Politecnico di Torino – Italy (Prof. Andrea Calimera)	*publications*
	University of Padova – Italy (Prof. Pietro Zanuttigh)	*publications*
	University of Tuscia – Italy (Prof. Flavia Tauro, Salvatore Grimaldi)	*publications*

Reviewing Service

†indicates *Outstanding Reviewer*

TPAMI	- IEEE Transactions on Pattern Analysis and Machine Intelligence
IJCV	- International Journal of Computer Vision
CVPR	- IEEE Conference on Computer Vision and Pattern Recognition (2019, 2020, 2022, 2023†, 2024†)

ECCV	- European Conference on Computer Vision (2020†, 2022, 2024†)
ICCV	- IEEE International Conference on Computer Vision (2019, 2021†, 2023)
TIP	- IEEE Transactions on Image Processing
3DV	- International Conference on 3D Vision (2024)
CVPRW	- 2nd International Workshop on Computer Vision for UAVs (UAVision2019)
JEI	- Journal of Electronic Imaging
ICCV	- 1st Workshop on Traditional Computer Vision in the Age of Deep Learning (TradiCV 2021)
ECCV	- 1st Workshop on Uncertainty Quantification for Computer Vision (UNCV 2022)
ECCV	- 2nd International Workshop on Computer Vision for UAVs (UAVision2018)
ICIAP	- International Conference on Image Analysis And Processing (2021)
TNNLS	- IEEE Transactions on Neural Networks and Learning Systems
IJDSN	- International Journal of Distributed Sensor Networks
VISI	- International Journal of Computer Vision
NTIRE	- New Trends in Image Restoration and Enhancement Workshop and Challenges (2023)

PhD Supervision

2023-Present	Ugo Leone Cavalcanti - co-supervised with Stefano Mattoccia (University of Bologna)

Co-Supervised Students (non-exhaustive list)

Master Theses	https://amslaurea.unibo.it/view/relatore/Tosi=3AFabio=3A=3A/
De Nardi, Dario	"Design and implementation of an Advanced Driver Assistance System on a racing prototype in the marine environment using stereo vision and Convolutional Neural Networks.", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Lo Russo, Andrea	"Reti neurali monoculari per la stima della profondità di superfici non-Lambertiane", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Malizia, Chiara	"High-Resolution Monocular Depth Estimation with Stereo Proxy Supervision", Università di Bologna, Corso di Studio in Artificial intelligence [LM-DM270]
Bartolomei, Luca	"Percezione depth guidata mediante proiezione virtuale di pattern", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Costanzino, Alex	"Mitigating non-Lambertian surfaces issues in Stereo Matching with Neural Radiance Fields", Università di Bologna, Corso di Studio in Artificial intelligence [LM-DM270]
Pumilia, Andrea	"Metodologie di Corrispondenza Stereo Basate su Deep Learning per Superfici Altamente Riflettenti e Trasparenti: Dataset e Architettura", Università di Bologna, Corso di Studio in Ingegneria elettronica e telecomunicazioni [L-DM270]
Laminetti, Giordano	"Depth estimation using deep learning and SLAM", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Mingozzi, Alessio	"Monitoraggio del distanziamento sociale mediante singola telecamera", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Conti, Andrea	"Diving between depth prediction and depth completion", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Benincasa, Antonio	"Deep-learning per stima della confidenza di mappe depth", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Boschini, Matteo	"Unsupervised Learning of Scene Flow", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Mangiocco, Armando	"Studio, sviluppo e ottimizzazione di algoritmi di visione 3D per applicazioni real-time", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]
Pallotti, Davide	"Integrazione di dati di disparità sparsi in algoritmi per la visione stereo basati su deep-learning", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]

Presutti, Pasquale "Algoritmo per la generazione di mappe depth da immagini stereo con CNN", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]

Rossetto, Andrea "CNN per view synthesis da mappe depth", Università di Bologna, Corso di Studio in Ingegneria informatica [LM-DM270]