Luca Magri

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Selected Experiences

Nov. 2019 – Present **Post-doctoral researcher**, *DEIB*, Politecnico di Milano, Milano, Italy.

Nov. 2018 – Oct. 2019 **R&D 3D engineer**, *Faro Technologies*, Open Technologies, Rezzato (BS), Italy.

- Prototyped efficient methods for hand-held scan acquisition.
- Developed and implemented acquisition and registration techniques for structured light scan.

Oct. 2017 – Oct. 2018 **Post-doctoral researcher**, *3Dflow srl & DPIA Department*, University of Udine, Italy.

- Conceived multi-model fitting algorithms for SCAN2BIM applcations on massive scanned point clouds.
- Developed a pipeline that has been integrated in 3Dflow final product.

Dec. 2015 – May 2017 **Post-doctoral researcher**, *3Dflow srl & Department of Informatics*, University of Verona, Italy.

- Designed and developed innovative Photometric Stereo techniques.
- Involved in the drafting and filing of patent applications.

2013 – 2017 **Teaching assistant** , University of Milano, Italy.
Led lessons and prepared exercises for undergraduate courses:

- Geometry at Faculty of Physics (2015) and Mathematics (2013)
- Calculus at Faculty of Natural Science (2014 and 2013)
- Mathematics and Statistic at Faculty of Agriculture (2013)
- Preparatory courses in Mathematics for first-year students (2017-2013)

Sept. 2012 – 2013 **High school Substitute Teacher of Math and Physic**, *Istituto Gonzaga*, Milano, Italy.

Jan. – July 2012 **R&I Intern at STMicroelectronics**, *AST Lab*, Agrate (MB), Italy.

- Contributed to the *Depth from perspective* project aimed at augmenting 2D contents for 3D Television.
- Developed techniques for depth estimation, starting from geometric content in video and images.

2010 – 2011 **Tutor for students with disabilities**, University of Milano, Italy.
Mentored and supported a student with disability with the aim of identifying and designing the strategies needed to perform successfully in his studies.

Education

Nov. 2012–Dec. 2015 **Ph.D in Mathematics & Statistic for Computational Sciences**, *University of Milano*, Italy.
PhD Thesis: "*Multiple structures recovery via preference analysis in conceptual space*" under the supervision of Prof. A. Fusiello (Dep. of Engineering, University of Udine). The research topic is outlier-robust multiple model estimation exploiting unsupervised learning techniques and low rank decomposition methods. The focus is on Computer Vision applications, however we successfully applied our methods in other applicative scenarios such as Cryptography.

Attended courses

- *Multi dimensional signal processing*, 24 h, University of Milano, July 2015.
- *Models of Random Structures*, Dominique Jeulin, 16 h, University of Milano, September 2014.
- *Cluster analysis*, Enza Messina, 18 h, University of Milano Bicocca, May 2014.
- *International Computer Vision Summer School*, 30 h, July 2013.
- *Sparse Representation*, Brendt Wohlberg, Politecnico di Milano, May 2013.
- *VisMac, Machine Vision*, 25 h, University of Genova, October 2012.

2011 **M.Sc. in Mathematics**, *University of Milano*, Italy, 110/110 cum laude.
Thesis: "Critical loci for recostruction of dynamic scene; an application of Algebraic Geometry to Computer Vision". Supervisor: Prof.sa M. Bertolini.

2009 **B.Sc. in Mathematics**, *University of Milano*, Italy.

2005 **High school, Classical studies**, *Liceo Classico Statale G. Berchet*, Milano, Italy.

Skills

Scientific expertise *Computer Vision*: 3D reconstruction, multi-view geometry, optimisation and robust estimation, photometric stereo.
Pattern Recognition: clustering and unsupervised learning, multi model fitting, data analysis, robust statistic, matrix decomposition and completion, sparse representation.

Programming Software developer in C++ with extensive expertise in Matlab modelling and programming. Basic command of JAVA.

Software Matlab, Maple, Macaulay2, LaTeX, 3DF-Zephyr.

Languages Italian (native), English (fluent).

Communication Involved in *popularisation of maths*: Collaborated with Matematita, XlaTangente and Il Sole 24 Ore. Invited speaker at Convegno di primavera Pristem 2017 - "Quando i matematici non entrano in aula". Conducted the course " La geometria della visione" for high school students at Bottega del matematico (2018 and 2019).

Research

Selected publications – full list available at google scholar and research gate

- L. Magri and A. Fusiello. T-Linkage: a continuous relaxation of J-Linkage for multi model fitting. Cvpr , 2014, (Acceptance rate: 29.88%).
- L. Magri and A. Fusiello. Robust Multiple Model Fitting with Preference Analysis and Low-rank Approximation. Bmvc, 2015, (Acceptance rate: 33%).
- F. Arrigoni, L. Magri, B. Rossi and P. Fragneto, A. Fusiello. Robust Absolute Rotation Estimation via Low-Rank and Sparse Matrix Decomposition. 3dv, 2014.
- L. Magri, S. Mella, F. Melzani, P. Fragneto and B. Rossi. J-DFA: a Novel Approach for Robust Differential Fault Analysis. In *Fault Diagnosis and Tolerance in Cryptography*, 2015.
- L. Magri, A. Fusiello. Multi model fitting as a Set Coverage problem. Cvpr, 2016, (Acceptance rate: 29.9%).
- L. Magri and A. Fusiello. Reconstruction of interior walls from point cloud data with min-hashed J-linkage. 3dv, 2018

Reviewer activity

Conferences Cvpr, Iccv, Eccv, Bmvc, Accv, 3dv, Eurographics.

Journals Tpami, Computer Vision and Image Understanding, Image and Vision Computing Journal.

Patents

- L. Magri, B. Rossi, S. Tripathi, P. Fragneto and E. Piccinelli, *Boundary Intersections space for lines detection*, Italy Patent VI2012A000303, filed November 9, 2012 – US Patent 20140161359, filed October 31, 2013.
- Y. Singh, R. Toldo, L. Magri, S. Fantoni and A. Fusiello, *Method for 3D modeling based on structure from motion processing of sparse 2D images*, European Patent application 18164011.1 -1210. March 26, 2018.

Reference

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