Curriculum Vitæ

Luca Cosmo

Affiliation

Current position: PostDoc assistant

Faculty of Informatics
USI Lugano
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6900, Lugano, Switzerland

Research interests and personal information

Since February 2019 I have a post-doctoral position at USI Lugano, working on Deep Learning applied to graph and non-Euclidean data. I spent three years (2015-2018) as a PostDoc in the Computer Vision group of Ca' Foscari University of Venice, after receiving my Ph.D. in Computer Science in 2015.

My research interests spread among different aspects of Computer Vision and Deep Learning. During my Ph.D. I mostly focused on camera calibration and three-dimensional structure acquisition techniques to perform a rapid and reliable contact-less measurement of objects using multiple cameras. During my last year of Ph.D. I spent four months as a visiting student at TU Munich within the Shape Analysis group of Prof. Dr. Daniel Cremers. Here I started a still ongoing collaboration on some advanced topics on Deformable Shape Matching, specifically in adopting spectral methods in presence of noise, partiality, and clutter. I've now joined the group of prof. Michael Bronstein, working on algorithms to apply Deep Learning to graphs and manifolds. In particular, we are trying to predict the spreading of Fake News on social graphs.

Since 2017 I'm also a member of the Computer Vision spin-off DigitalViews Srl, in which I've been a Scientific Advisor for several industrial projects concerning the in-line quality control from both a metrological and non-metrological (e.g. scratches or visual anomalies) point of view.

I've also been involved in several collateral activities, like teaching activities (see section Teaching) and science popularization events (see section Events, communication, and science popularization). I serve also as a referee in several international Journals and Conferences (e.g. Pattern Recognition, Pattern Recognition Letters, ECCV, BMVC, 3DV) and I was part of the Technical Committee of BMVC 2018. I've organized two SHREC contests in non-rigid shape matching and retrieval (2016,2017).

Education

Sept. 2012 - February 2016

PhD in Computer Science
Università Ca' Foscari Venezia
Supervisor: prof. Andrea Torsello
Topics: Camera calibration; Pose estimation; 3D reconstruction; Tangible user interfaces; Stereoscopic user interfaces; Non-rigid shape analysis.
Thesis: "3D Acquisition and Analysis with Applications in Interaction and Contactless Measurement"

Oct. 2009 - Mar. 2012

Master's degree in Computer Science *(summa cum laude)*
Università Ca' Foscari Venezia
Supervisor: prof. Andrea Torsello
Thesis: "Corrispondenza densa tra forme attraverso embedding di superficie e correlazione sferica"

Oct. 2005 - Mar. 2009

Bachelor's degree in Computer Science
Università Ca' Foscari Venezia
Supervisor: prof. Agostino Cortesi
Thesis: ": Analisi formale e sviluppo 3D di giochi per una piattaforma di Game Programming volta all'orientamento universitario"

Sep. 2000 - Jun. 2005

High School diploma in Accounting and Bookkeeping
Istituto Tecnico Commerciale Riccati-Luzzati
Main subjects: Business Administration, Political Economy, Public and Private Law

Academic Experience

February 2019 - Now

PostDoc in Computer Science
USI Lugano
Supervisor: prof. Michael M. Bronstein
Title: Deep Learning on MANifolds and graphs,
Topics: Shape Analysis, Deep Learning;

September 2018 - January 2019

Seinor Researcher scholarship
Università Ca' Foscari Venezia
Supervisor: prof. Andrea Albarelli
Title: Il Deep Learning come strumento abilitante per l'ispezione non metrologica,
Topics: 3D Computer Vision, Deep Learning, Convolutional Neural Networks;

September 2017 - August 2018

PostDoc in Computer Science
Università Ca' Foscari Venezia
Supervisor: prof. Andrea Albarelli
Title: Visione artificiale per il controllo della qualità superficiale della pietra sinterizzata.
Topics: Camera Calibration and 3D reconstruction, Machine Learning, Convolutional Neural Networks;

September 2016 - 2017
PostDoc in Computer Science
Università Ca' Foscari Venezia
Supervisor: prof. Andrea Albarelli
Title: Interfacce tangibili e sistemi di consultazione per dati artistici annotati.
Topics: Tangible user interfaces; Stereoscopic user interfaces;

September 2015 - August 2016
PostDoc in Computer Science
Università Ca' Foscari Venezia
Supervisor: prof. Augusto Celentano
Title: Augmented reality on See-Through wearable displays.
Topics: Pose estimation; Tangible user interfaces; Stereoscopic user interfaces;

Visiting Positions

Sep. 2019 - Oct. 2019 ***Visiting Research*** (1 months, Prof. Michael M. Bronstein) Department of Computing, Imperial College London, London, UK

Dec. 2014 - April. 2015 ***Visiting Student*** (4 months, Prof. Dr. Daniel Cremers) Department of Computer Science, Technische Universität München (TUM), Munich, Germany

Teaching

Lower-division undergraduate courses

- *Contract professor for the course: Abilità Informatiche*, Università Ca' Foscari Venezia (AA 2017-2018)
- *Teaching assistant in Web languages: Javascript*, Università Ca' Foscari Venezia (2016)
- *Teaching assistant in Computer Vision*, Università Ca' Foscari Venezia (2014, 2016)
- *Teaching assistant in Analysis*, Università Ca' Foscari Venezia (2013,2014)
- *Teaching assistant in Basic compute skills*, Università Ca' Foscari Venezia (2012-2015)
- *Teaching assistant in Databases*, Università Ca' Foscari Venezia (2013)
- *Teaching assistant in Object Oriented Programming*, Università Ca' Foscari Venezia (2012)

Master courses

- *Contract professor for the master course: Business Intelligence and Data Management*, Università Ca' Foscari Venezia (2016-2017)

Training courses

- *Nuovi software per l'azienda 2.0*, FTE course managed by Sive Formazione S.r.l. (2017)
- *Sviluppo di applicazioni native destinate a dispositivi Android engine*, Istituto Tecnico Industriale Statale "Max Planck" (2016)

- *Nuove soluzioni tecnologiche per l'innovazione dei processi produttivi aziendali: J2EE server faces and web services*, FTE course managed by Sive Formazione S.r.l. (2015)
- *Progettista e Sviluppatore Software JEE*, FTE course managed by Sive Formazione S.r.l. (2014)

Events, communication and science popularization

Events and exhibitions

- VenetoNight 2014-2015 (European Commission Funded Researchers' Night), Interactive technical demo, *"Virtual book: simultaneous 3D acquisition and rendering of text and animations over the white pages of a book."*, Università Ca' Foscari Venezia (2014)
- VenetoNight 2013 (European Commission Funded Researchers' Night), Interactive technical demo, *"Holographic Table: user position based stereoscopic projection of virtual scenes."*, Università Ca' Foscari Venezia (2013)
- VenetoNight 2012 (European Commission Funded Researchers' Night), Computer Vision and Artificial Intelligence demo, *"Vision-based non-photorealistic representation and automated hand drawing by a robotic arm"*, Università Ca' Foscari Venezia (2012)

Museum installations

- MOCKBA Underground - Pittura astratta dal 1960 (Russian abstract paintings from 1960), Two large multitouch tables that can be used to control the combination of painting in a virtual gallery projected on the surrounding walls, Spazi Espositivi Università Ca' Foscari Venezia (2012)
- Avanguardia Russa: esperienze di un mondo nuovo (Russian avant-garde paintings), An interactive projection setup controlled by a tangible interface augmented by annotated factsheets, Palazzo Leoni Montanari, Vicenza (2012)
- William Congdon a Venezia (1948-1960): Uno sguardo americano (Painting by William Cogndon depicting Venice), Three large multitouch tables representing the island of Venice in different historical periods and controlling interactive wall projections, Spazi Espositivi Università Ca' Foscari Venezia (2012)

Technological Transfer

- Co-founder of the spin-off DigitalMetrix S.r.l. winner of the following funded projects:
  - TimWCap 2017: 20.000 euros grant for the development of a structured light scanner to perform a fast 3D reconstruction on shiny surfaces (e.g. metals) with the goal of assessing the adherence to the required metrological standards.
  - Coordinator of a 500.000 euros European funded project (FESR) aiming to apply Computer Vision techniques to the non metrological quality assessment of syntherized stone surfaces.
- Member of the (former) spin-off DigitalViews S.r.l. in which I also serve as scientific advisor for projects regarding metrological and non-metrological inspection.

Grants and scholarships

- Phd studies funded by national grant (2012-2015)

Scientific awards

- Best first year student award of the Master's Degree Programme in Computer Science, DAIS, Università Ca' Foscari di Venezia (2011)
- Award for the best Phd research work presentation on the academic year 2012-2013, Università Ca' Foscari di Venezia (2013)

Invited Talks, Keynotes, Tutorials and Seminars

- *Functional Maps: A Flexible Representation for Learning and Computing Correspondence*, tutorial organizer and speaker at 3DV 2018, Verona
- *Spectral geometry of shapes under topological alterations and its application to shape matching*, speaker at minisymposia on "Spectral geometry of shapes under topological alterations and its application to shape matching", SIAM 2018, Bologna
- *Consistent Partial Matching of Shape Collections via Sparse Modeling.* Talk at USI Lugano, invited by Michael M. Bronstein
- *Consistent Partial Matching of shape Collections via Sparse Modeling*, Invited Paper at Eurographics 2016, Lisbon
- *A 5 Degrees of Freedom Multi-User Tracking Device*, Keynote speech at Third International Conference on Software and Emerging Technologies for Education, Culture, Entertainment, and Commerce (SETECEC 2014, Venice)
- *A Robust Tracking Device for View Dependent Stereoscopic Display*, Keynote speech at Fourth International Symposium on Communicability, Computer Graphics and Innovative Design for Interactive Systems (CCGIDIS 2014, Venice)

Publications

Publications statistics

	Scopus	Scholar
H-index:	9	10
Total number of documents:	32	34
Total number of citations:	211	291
Total number of journals:	8	
Journals average impact-factor:	3.109	

International journals

[J.8] M. Pistellato, F. Bergamasco, A. Albarelli, L. Cosmo, A. Gasparetto, and A. Torsello. Robust phase unwrapping by probabilistic consensus. volume 121, pages 428–440, 2019b. doi: 10.1016/j.optlaseng.2019.05.006
[IF: 4.059, Cited by: 21]

[J.7] L. Cosmo, E. Rodolà, A. Albarelli, F. Mémoli, and D. Cremers. Consistent partial matching of shape collections via sparse modeling. *Computer Graphics Forum*, 36 (1):209–221, 2017b. doi: 10.1111/cgf.12796
[IF: 2.046, Cited by: 21]

[J.6] E. Rodolà, L. Cosmo, M.M. Bronstein, A. Torsello, and D. Cremers. Partial functional correspondence. *Computer Graphics Forum*, 36(1):222–236, 2017a. doi: 10.1111/cgf.12797
[IF: 2.046, Cited by: 65]

[J.5] F. Bergamasco, A. Albarelli, L. Cosmo, E. Rodola, and A. Torsello. An accurate and robust artificial marker based on cyclic codes. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(12):2359–2373, 2016. doi: 10.1109/TPAMI.2016.2519024 [IF: 8.329, Cited by: 18]

[J.4] A. Albarelli, L. Cosmo, F. Bergamasco, and F. Sartoretto. Phase-based spatio-temporal interpolation for accurate 3d localization in camera networks. *Pattern Recognition Letters*, 63:1–8, 2015d. doi: 10.1016/j.patrec.2015.05.014
[IF: 1.586, Cited by: 2]

[J.3] A. Albarelli, L. Cosmo, F. Bergamasco, F. Sartoretto, and A. Torsello. A 5 degrees of freedom multi-user pointing device for interactive whiteboards. *Pattern Analysis and Applications*, 19(1):237–250, 2016. doi: 10.1007/s10044-015-0457-3
[IF: 1.352, Cited by: 0]

[J.2] A. Albarelli, F. Bergamasco, A. Celentano, L. Cosmo, and A. Torsello. Using multiple sensors for reliable markerless identification through supervised learning. *Machine Vision and Applications*, 24(7):1539–1554, 2013. doi: 10.1007/s00138-013-0492-2
[IF: 1.444, Cited by: 2]

[J.1] E. Rizzo, L. Pizzol, A. Zabeo, E. Giubilato, A. Critto, L. Cosmo, and A. Marcomini. An information system for brownfield regeneration: providing customised information according to stakeholders' characteristics and needs. *Journal of Environmental Management*, 217:144–156, 2018. doi: 10.1016/j.jenvman.2018.03.059
[IF: 4.005, Cited by: 0]

Chapters in books

[B.1] A. Albarelli, L. Cosmo, and F. Bergamasco. Practical metrics for error assessment with interactive museum installations. *Handbook of Research on Interactive Information Quality in Expanding Social Network Communications*, pages 70–83, 2014a. doi: 10.4018/978-1-4666-7377-9.ch005

Refereed conference papers

[C.24] Luca Cosmo, Mikhail Panine, Arianna Rampini, Maks Ovsjanikov, Michael M. Bronstein, and Emanuele Rodola. Isospectralization, or how to hear shape, style, and correspondence. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2019

[C.23] M. Pistellato, F. Bergamasco, A. Albarelli, L. Cosmo, A. Gasparetto, and A. Torsello. Stochastic phase estimation and unwrapping. pages 200–209, 2019a

[C.22] M. Pistellato, L. Cosmo, F. Bergamasco, A. Gasparetto, and A. Albarelli. Adaptive albedo compensation for accurate phase-shift coding. volume 2018-August, pages 2450–2455, 2018b. doi: 10.1109/ICPR.2018.8545465

[C.21] M. Pistellato, F. Bergamasco, L. Cosmo, A. Gasparetto, D. Ressi, and A. Albarelli. Neighborhood-based recovery of phase unwrapping faults. volume 2018-August, pages 2462–2467, 2018a. doi: 10.1109/ICPR.2018.8546052

[C.20] A. Gasparetto, D. Ressi, F. Bergamasco, M. Pistellato, L. Cosmo, M. Boschetti, E. Ursella, and A. Albarelli. Cross-dataset data augmentation for convolutional neural networks training. volume 2018-August, pages 910–915, 2018b. doi: 10.1109/ICPR.2018.8545812

[C.19] A. Gasparetto, L. Cosmo, E. Rodola, M. Bronstein, and A. Torsello. Spatial maps: From low rank spectral to sparse spatial functional representations. *Proceedings - 2017 International Conference on 3D Vision, 3DV 2017*, pages 477–485, 2018a. doi: 10.1109/3DV.2017.00061

[C.18] F. Bergamasco, L. Cosmo, A. Gasparetto, A. Albarelli, and A. Torsello. Parameter-free lens distortion calibration of central cameras. *Proceedings of the IEEE International Conference on Computer Vision*, 2017-October:3867–3875, 2017a. doi: 10.1109/ICCV.2017.415

[C.17] A. Gasparetto, L. Cosmo, A. Torsello, and R. Wilson. Non-rigid dense bijective maps. *Proceedings - International Conference on Pattern Recognition*, pages 3781–3786, 2017. doi: 10.1109/ICPR.2016.7900223

[C.16] E. Rodolà, L. Cosmo, O. Litany, M. M. Bronstein, A. M. Bronstein, N. Audebert, A. Ben Hamza, A. Boulch, U. Castellani, et al. Shrec '17: Deformable shape retrieval with missing parts. *Eurographics Workshop on 3D Object Retrieval, EG 3DOR*, 2017b. doi: 10.2312/3dor.20171057

[C.15] F. Bergamasco, L. Cosmo, M. Schiavinato, A. Albarelli, and A. Torsello. Dense multi-view homography estimation and plane segmentation. *Proceedings - International Conference on Pattern Recognition*, pages 3739–3744, 2017b. doi: 10.1109/ICPR.2016.7900216

[C.14] L. Cosmo, A. Albarelli, F. Bergamasco, A. Torsello, E. Rodola, and D. Cremers. A game-theoretical approach for joint matching of multiple feature throughout unordered images. *Proceedings - International Conference on Pattern Recognition*, pages 3715–3720, 2017a. doi: 10.1109/ICPR.2016.7900212

[C.13] L. Cosmo, E. Rodola, J. Masci, A. Torsello, and M.M. Bronstein. Matching deformable objects in clutter. *Proceedings - 2016 4th International Conference on 3D Vision, 3DV 2016*, pages 1–10, 2016b. doi: 10.1109/3DV.2016.10

[C.12] L. Cosmo, E. Rodolà, M.M. Bronstein, A. Torsello, D. Cremers, and Y. Sahillioğlu. Shrec'16: Partial matching of deformable shapes. *Eurographics Workshop on 3D Object Retrieval, EG 3DOR*, pages 61–67, 2016a. doi: 10.2312/3dor.20161089

[C.11] Z. Lähner, E. Rodolà, M.M. Bronstein, D. Cremers, O. Burghard, L. Cosmo, A. Dieckmann, R. Klein, and Y. Sahillioğlu. Shrec'16: Matching of deformable shapes with topological noise. *Eurographics Workshop on 3D Object Retrieval, EG 3DOR*, pages 55–60, 2016. doi: 10.2312/3dor.20161088

[C.10] F. Bergamasco, A. Albarelli, L. Cosmo, A. Torsello, E. Rodolà, and D. Cremers. Adopting an unconstrained ray model in light-field cameras for 3d shape reconstruction. *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, 07-12-June-2015:3003–3012, 2015. doi: 10.1109/CVPR.2015.7298919

[C.9] A. Albarelli, A. Celentano, L. Cosmo, and R. Marchi. On the interplay between data overlay and real-world context using see-through displays. *ACM International Conference Proceeding Series*, 28:58–65, 2015b. doi: 10.1145/2808435.2808455

[C.8] A. Albarelli, L. Cosmo, F. Bergamasco, and A. Gasparetto. Objective and subjective metrics for 3d display perception evaluation. *ICPRAM 2015 - 4th International Conference on Pattern Recognition Applications and Methods, Proceedings*, 2: 309–317, 2015c

[C.7] A. Albarelli, A. Celentano, and L. Cosmo. Evaluating stereo vision and user tracking in mixed reality tasks! *2015 IEEE Symposium on 3D User Interfaces, 3DUI 2015 - Proceedings*, pages 81–88, 2015a. doi: 10.1109/3DUI.2015.7131730

[C.6] A. Albarelli, L. Cosmo, F. Bergamasco, and A. Torsello. High-coverage 3d scanning through online structured light calibration. *Proceedings - International Conference on Pattern Recognition*, pages 4080–4085, 2014b. doi: 10.1109/ICPR.2014.699

[C.5] L. Cosmo, A. Albarelli, F. Bergamasco, and A. Torsello. Design and evaluation of a viewer-dependent stereoscopic display. *Proceedings - International Conference on Pattern Recognition*, pages 2861–2866, 2014b. doi: 10.1109/ICPR.2014.493

[C.4] A. Albarelli, L. Cosmo, and A. Celentano. Evaluating accuracy of perception in an adaptive stereo vision interface. *Proceedings of the Workshop on Advanced Visual Interfaces AVI*, pages 333–334, 2014c. doi: 10.1145/2598153.2600036

[C.3] F. Bergamasco, L. Cosmo, A. Albarelli, and A. Torsello. Camera calibration from coplanar circles. *Proceedings - International Conference on Pattern Recognition*, pages 2137–2142, 2014. doi: 10.1109/ICPR.2014.372

[C.2] L. Cosmo, A. Albarelli, and F. Bergamasco. A low cost tracking system for position-dependent 3d visual interaction. *Proceedings of the Workshop on Advanced Visual Interfaces AVI*, pages 351–352, 2014a. doi: 10.1145/2598153.2600030

[C.1] F. Bergamasco, L. Cosmo, A. Albarelli, and A. Torsello. A robust multi-camera 3d ellipse fitting for contactless measurements. *Proceedings - 2nd Joint 3DIM/3DPVT Conference: 3D Imaging, Modeling, Processing, Visualization and Transmission, 3DIMPVT 2012*, pages 168–175, 2012. doi: 10.1109/3DIMPVT.2012.22