

ALLEGATO B

UNIVERSITÀ DEGLI STUDI DI MILANO

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[Federica Arrigoni] CURRICULUM VITAE

PERSONAL DATA

SURNAME	ARRIGONI
NAME	FEDERICA
DATE OF BIRTH	26/10/1989

WORK EXPERIENCE

Assistant professor (RTDa)

University of Trento [4 May 2020 - Current] City: Trento (Italy)

Department of Information Engineering and Computer Science (DISI)

Junior Researcher

Czech Technical University in Prague [1 Mar 2018 - 28 Feb 2020] City: Prague (Czechia)

- Unit: Czech Institute of Informatics, Robotics and Cybernetics (CIIRC)
- Advisor: Prof. Tomas Pajdla

Internship

STMicroelectronics [Mar 2013 - Jul 2014] City: Agrate Brianza (Italy)

- Laboratory: Advanced System Technology
- Advisor: Dr. Pasqualina Fragneto

EDUCATION AND TRAINING

Ph.D. in Industrial and Information Engineering

Università degli Studi di Udine [Nov 2014 - Mar 2018] Address: Udine (Italy)

Thesis: Synchronization Problems in Computer Vision (Advisor: Prof. Andrea Fusiello)

International Summer School VISMAC (Machine Vision)

Gruppo Italiano Ricercatori in Pattern Recognition (GIRPR) [13 Jun 2016 - 17 Jun 2016] Address: Pordenone - Grado (Italy)

Master degree in Mathematics

Università degli Studi di Milano [Oct 2011 - Dec 2013]

Address: Milano (Italy)

Final grade : 110/110 cum laude

Thesis: Advances in global motion estimation: theory and practice

Bachelor degree in Mathematics

Università degli Studi di Milano [Sep 2008 - Oct 2011]

Address: Milano (Italy)

Final grade : 110/110 cum laude

Thesis: Il metodo alternante di Schwarz e il problema di Dirichlet per l'equazione di Laplace

Scientific High School degree

Istituto Salesiano S. Ambrogio [Sep 2003 - Jul 2008] Address: Milano (Italy)

Final grade : 100/100

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s): English (C1 level)

DIGITAL SKILLS

Matlab, C, Java

RESEARCH INTERESTS

Geometric Computer Vision

My current research focuses on the mathematical models underpinning several algorithms in the field of 3D Computer Vision. A particular emphasis is given on “synchronization”, that is a general framework to solve problems involving multiple entities (e.g., images or 3D point clouds) organized as a “graph”, where the task is to seek for global consistency. Examples of synchronization include structure from

motion (where the task is recovering 3D information from multiple images), multi-view matching (where the task is to find correspondences between key-points in multiple images) and 3D point cloud registration (where the task is to find the transformations that bring multiple point clouds into alignment). Another instance is motion segmentation, where the task is to detect moving objects in a dynamic 3D scene. My research studies the aforementioned topics under a "traditional/classical" perspective, in the sense that analytical/explicit models are deployed as opposed to learned/neural ones. Moreover, theoretical aspects of 3D Computer Vision are being explored, with the aim of studying under which assumptions a specific problem (e.g., 3D reconstruction) is well posed. I currently collaborate with the following universities:

- University of Udine
- Politecnico di Milano
- Czech Technical University in Prague
- Stanford University.

AWARDS

Outstanding Reviewer [Jun 2021]

IEEE Conference on Computer Vision and Pattern Recognition (CVPR), virtual

Registration Award (450 GBP) [Aug 2020]

Women in Computer Vision (WiCV) Workshop, European Conference on Computer Vision (ECCV), virtual

PhD Award (1500 €) [May 2019]

Università degli Studi di Udine (Italy)

Best Doctoral Thesis Award (500€) [Aug 2018]

Convegno CVPL, Vico Equense (Italy)

Travel Award (600€) [Oct 2017]

International Conference on Computer Vision (ICCV) Doctoral Consortium, Venezia (Italy)

Best Poster Award [Jun 2016]

International Summer School VISMAL PhDForum, Grado (Italy)

PATENTS

Absolute rotation estimation including outlier detection via low-rank and sparse matrix decomposition

[Dec 2017]

- Patent Number: US9,846,974 B2

- Assignee: STMicroelectronics
- Inventors: Federica Arrigoni, Beatrice Rossi, Pasqualina Fragneto

PROFESSIONAL SERVICE

Chair

- co-organizer for the 1st Workshop on Traditional Computer Vision in the Age of Deep Learning (TradiCV), in conjunction with the International Conference on Computer Vision (ICCV), October 2021 (virtual), <https://sites.google.com/view/tradictv/home?authuser=0>

Editor

- Guest editor for the special issue on Traditional Computer Vision in the Age of Deep Learning of the International Journal of Computer Vision (IJCV), <https://www.springer.com/journal/11263/updates/19335400>

Reviewer

- Reviewer for the following international conferences: ECCV, ICCV, CVPR and 3DV
- Emergency reviewer at 3DV 2018

Volunteer

- Student volunteer at 3DV 2018, September 2018, Verona (Italy)

TEACHING EXPERIENCE

Geometric Computer Vision: from images to 3D models [12 Apr 2021 - 16 Apr 2021]

PhD Course, University of Trento (Italy) <https://ict.unitn.it/node/873>

Synchronization: a general framework for mosaicking, 3D reconstruction, matching and segmentation problems [10 Jan 2021]

Short course (tutorial), International Conference on Pattern Recognition (ICPR), virtual <https://www.micc.unifi.it/icpr2020/index.php/tutorial8/>

Synchronization and Cycle Consistency in Computer Vision [14 Jun 2020]

Short course (tutorial), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), virtual <https://synchinvision.github.io>

Supervision

- G. K. Tejus, visiting student from the Indian Institute Of Technology (ISM), Dhanbad. Graph neural networks for 3D Computer Vision, co-supervision with Elisa Ricci (ongoing)
- Riccardo Franceschini. Multi-modal emotion recognition, co-supervision with Elisa Ricci (ongoing)

- Vishnu V. Muthu. Synchronization of projective frames. Master Thesis in Computer Vision, Université de Bourgogne (France), co-supervision with Andrea Fusiello (2017).

ONLINE RESOURCES

Released Code (MATLAB)

- Synchronization: <http://www.diegm.uniud.it/fusiello/demo/gmf/>
- Localization: <http://www.diegm.uniud.it/fusiello/demo/gmf/esc/index.html>
- Multi-view matching: <http://www.diegm.uniud.it/fusiello/demo/mvm/>
- Motion segmentation: https://github.com/federica-arrigoni/ICCV_19

PROJECTS

SPRING (Socially Pertinent Robots in Gerontological Healthcare) [May 2020 - Current]

- Member of the research team
- <https://spring-h2020.eu>

ARTEMIS (Assistive Robots wiTh EMotional Skills) [Apr 2021 - Sep 2021]

- Member of the research team
- Project founded by Fondazione VRT

IMPACT (Intelligent Machine Perception Project) [Mar 2018 - Feb 2020]

- Member of the research team
- <http://impact.ciirc.cvut.cz>

PRESENTATIONS

Invited Talks

- Synchronization problems in Computer Vision. SIAM Conference on Applied Algebraic Geometry (AG21), Minisymposium on Algebraic Vision, August 2021 (virtual), <https://meetings.siam.org/program.cfm?CONFCODE=AG21>
- Synchronization problems in Computer Vision. Università di Trento (Italy), November 2019.
- Synchronization problems in Computer Vision. Chalmers University of Technology, Gothenburg (Sweden), December 2017.

- Synchronization problems in Computer Vision. Czech Technical University in Prague, Prague (Czech Republic), December 2017, <http://impact.ciirc.cvut.cz/seminars/#seminarR4I>

Presentations at Conferences

- Motion segmentation with pairwise matches and unknown number of motions. International Conference on Pattern Recognition (ICPR), virtual, January 2021.
- On the usage of the trifocal tensor in motion segmentation. European Conference in Computer Vision (ECCV), virtual, August 2020.
- On the usage of the trifocal tensor in motion segmentation. Women in Computer Vision Workshop (WiCV), virtual, August 2020.
- Motion segmentation via synchronization. Workshop on Autonomous Navigation in Unconstrained Environments (AUTONUE), Seoul (Korea), November 2019.
- Robust motion segmentation from pairwise matches. International Conference on Computer Vision (ICCV), Seoul (Korea), October 2019.
- Synchronization problems in Computer Vision. Conoscenza in Festa, Udine (Italy), May 2019.
- Synchronization problems in Computer Vision. Convegno dell'Associazione Italiana in Computer Vision, Pattern Recognition e Machine Learning (CVPL), Vico Equense (Italy), August 2018.
- Practical and efficient multi-view matching. Spotlight presentation - International Conference on Computer Vision (ICCV), Venezia (Italy), October 2017.
- Synchronization problems in Computer Vision. International Conference on Computer Vision (ICCV) Doctoral Consortium, Venezia (Italy), October 2017.
- Synchronization of multiple views. PhD Expo&Conference, Università degli studi di Udine(Italy), May 2017.
- Camera motion from group synchronization. International Conference on 3D Vision (3DV), Stanford University (USA), October 2016.
- Global registration of 3D point sets via LRS decomposition. European Conference on Computer Vision (ECCV), Amsterdam (Netherlands), October 2016.
- Global registration of 3D point sets via LRS decomposition. International Workshop on Recovering 6D Object Pose, Amsterdam (Netherlands), October 2016.
- On the orientation of networks of frames. International Summer School VISMAL PhDForum, Grado (Italy), June 2016.
- On the orientation of networks of frames. PhD Expo&Conference, Università degli studi di Udine (Italy), May 2016.
- Robust and efficient camera motion synchronization via matrix decomposition. International Conference on Image Analysis and Processing (ICIAP), Genova (Italy), September 2015.
- Global motion synchronization. PhD Expo&Conference, Università degli studi di Udine (Italy), June 2015.
- Robust absolute rotation estimation via low-rank and sparse matrix decomposition. Oral presentation - International Conference on 3D Vision (3DV), Tokyo (Japan), December 2014.

- Robust global motion estimation with matrix completion. ISPRS Technical Commission V Symposium, Riva del Garda (Italy), June 2014.

PUBLICATIONS

Journals

1. Federica Arrigoni and Andrea Fusiello. Synchronization problems in Computer Vision with closed-form solutions. *International Journal of Computer Vision*, 128: 26 - 52, 2020.
2. Federica Arrigoni and Andrea Fusiello. Bearing-based network localizability: a unifying view. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 41(9): 2049-2069, 2019.
3. Federica Arrigoni, Beatrice Rossi, Pasqualina Fragneto and Andrea Fusiello. Robust synchronization in $SO(3)$ and $SE(3)$ via low-rank and sparse matrix decomposition. *Computer Vision and Image Understanding*, 174: 95 - 113, 2018.
4. Federica Arrigoni, Beatrice Rossi and Andrea Fusiello. Spectral synchronization of multiple views in $SE(3)$. *SIAM Journal on Imaging Sciences*, 9(4): 1963 - 1990, 2016.

Conference Proceedings

1. Jiahui Huang, He Wang, Tolga Birdal, Minhyuk Sung, Federica Arrigoni, Shi-Min Hu, Leonidas Guibas. MultiBodySync: multi-body segmentation and motion estimation via 3D scan synchronization. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021, oral presentation.
2. Federica Arrigoni, Luca Magri and Tomas Pajdla. Motion segmentation with pairwise matches and unknown number of motions. *International Conference on Pattern Recognition (ICPR)*, pages 1051-14651, 2021.
3. Federica Arrigoni, Luca Magri and Tomas Pajdla. On the usage of the trifocal tensor in motion segmentation. *European Conference on Computer Vision (ECCV)*, volume 12365 of *Lecture Notes in Computer Science*, pages 514-530. Springer International Publishing, 2020.
4. Federica Arrigoni and Tomas Pajdla. Robust motion segmentation from pairwise matches. *International Conference on Computer Vision (ICCV)*, pages 671-681, 2019.
5. Federica Arrigoni and Tomas Pajdla. Motion segmentation via synchronization. *International Conference on Computer Vision Workshops (ICCVW)*, 2019.
6. Eleonora Maset, Federica Arrigoni, and Andrea Fusiello. Practical and efficient multi-view matching. *International Conference on Computer Vision (ICCV)*, pages 4568-4576, 2017, spotlight presentation.
7. Federica Arrigoni, Eleonora Maset, and Andrea Fusiello. Synchronization in the symmetric inverse semigroup. *International Conference on Image Analysis and Processing (ICIAP)*, volume 10485 of *Lecture Notes in Computer Science*, pages 70-81. Springer International Publishing, 2017.
8. Federica Arrigoni, Andrea Fusiello, and Beatrice Rossi. Camera motion from group synchronization. *International Conference on 3D Vision (3DV)*, pages 546-555, 2016.

9. Federica Arrigoni, Beatrice Rossi and Andrea Fusiello. Global registration of 3D point sets via LRS decomposition. European Conference on Computer Vision (ECCV), volume 9908 of Lecture Notes in Computer Science, pages 489-504. Springer International Publishing, 2016.
10. Federica Arrigoni, Andrea Fusiello, and Beatrice Rossi. On computing the translations norm in the epi polar graph. International Conference on 3D Vision (3DV), pages 300-308, 2015.
11. Federica Arrigoni, Beatrice Rossi, and Andrea Fusiello. Robust and efficient camera motion synchronization via matrix decomposition. International Conference on Image Analysis and Processing (ICIAP), volume 9279 of Lecture Notes in Computer Science, pages 444-455. Springer International Publishing, 2015.
12. Federica Arrigoni, Luca Magri, Beatrice Rossi, Pasqualina Fragneto, and Andrea Fusiello. Robust absolute rotation estimation via low-rank and sparse matrix decomposition. International Conference on 3D Vision (3DV), pages 491-498, 2014, oral presentation.
13. Federica Arrigoni, Beatrice Rossi, Francesco Malapelle, Pasqualina Fragneto, and Andrea Fusiello. Robust global motion estimation with matrix completion. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XL-5:63 - 70, 2014.

Under Review

- Federica Arrigoni, Elisa Ricci, and Tomas Pajdla. Multi-frame motion segmentation by combining two- frame results. submitted to the International Journal of Computer Vision (IJCV), special issue on 3D vision.
- Federica Arrigoni, Andrea Fusiello, Elisa Ricci, and Tomas Pajdla. Viewing graph solvability via cycle consistency. submitted to the International Conference on Computer Vision (ICCV).
- Andrea Porfiri Dal Cin, Luca Magri, Federica Arrigoni, Andrea Fusiello, and Giacomo Boracchi. Synchronization of group-labelled multi-graphs. submitted to the International Conference on Computer Vision (ICCV).

RECOMMENDATIONS

- Elisa Ricci (University of Trento) Email: e.ricci@unitn.it
- Tomas Pajdla (Czech Technical University in Prague) Email: pajdla@cvut.cz
- Andrea Fusiello (University of Udine) Email: andrea.fusiello@uniud.it
- Pasqualina Fragneto (STMicroelectronics) Email: pasqualina.fragneto@st.com

Data

08/07/2021

Luogo

Rho