

EMPLOYMENT

- **ETH Zürich, Switzerland.** [Nov. 2019 - To date.]
Professorship for Computer Vision
Funded by: ETH Zürich Foundation.
Advised and Directed by: Luc Van Gool.
Advisor at **Google**: Vittorio Ferrari.
[*Declined PostDoc offer by University of Oxford.]
- **Google New York, USA.** [May 2019 - Aug. 2019.]
Topic: Geometric Learning
- **Uurmi Systems, Hyderabad, India.** [July 2014 - June 2015.]
Consultant Engineer.
Position: Computer Vision Algorithm Developer
- **INRIA, e-Motion, Grenoble-France.** [Sept. 2013 - Feb. 2014.]
Visiting Scientist.
Topic: Autonomous Driving
- **IIIT-Hyderabad, India.** [Jan. 2011 - Aug. 2013.]
Research Assistant.
Topic: Robot Vision
- **IIT-Hyderabad, India.** [Aug. 2010 - Dec. 2010.]
Project Associate.
Topic: Pervasive Sensor Networks

EDUCATION

- **Australian National University.** [Sept. 2015 - July 2019.]
Ph.D. in Engineering and Computer Science.
Thesis: Non-Rigid Structure from Motion.
Supervisory Panel: Yuchao Dai, Hongdong Li, Richard Hartley.
★ *Nominated for J. G. Crawford Prize at ANU for Best Interdisciplinary Ph.D. Thesis 2019.*
★ *Winner of Non-Rigid Structure from Motion Challenge, Awarded by Disney Research.*
★ *Recipient of HDR Merit Scholarship. (Highly competitive scholarship at ANU)*
- **IIIT-Hyderabad.** July 2013.
M.S. in Computer Science and Engineering.
Research Area: Robot Vision.
Scholarship Student.

AWARDS AND ACHIEVEMENTS

- Nominated for J. G. Crawford Prize for Best Interdisciplinary Ph.D. Thesis 2019 at ANU.
- Awarded Australian National University Vice-Chancellor Grant.
- **Winner** of NRSfM Challenge at CVPR 2017, Prize awarded by Disney Research.
- Student funding to attend ICML 2017, Sydney Australia and ICCV 2017, Venice Italy.
- Student funding to attend Robot Vision Summer School 2016, Kiola, Australia.
- Recipient of “Australian National University Higher Degree Research” Merit Scholarship Award.
- Recipient of “Best Innovative Group 2014”, by Uurmi Systems Private Limited, India.
- Fully funded by Campus France to do research at INRIA, Grenoble-France.
- Full-Time Scholarship Student for MS program at IIIT-Hyderabad, India.
- Winner of “8085 Programming” and “Project Demonstration” contest at TITIKSHA 2008.

PUBLICATIONS

3D Computer Vision

- [1] [WACV 22] [Neural Radiance Fields Approach to Deep Multi-View Photometric Stereo](#).
Berk Kaya, Suryansh Kumar, Francesco Sarno, Vittorio Ferrari, Luc Van Gool.
IEEE/CVF Winter Conference on Applications of Computer Vision, 2022, Hawaii, USA.
- [2] [WACV 22] [Neural Architecture Search for Efficient Unalibrated Deep Photometric Stereo](#).
Francesco Sarno, Suryansh Kumar, Berk Kaya, Zhiwu Huang, Vittorio Ferrari, Luc Van Gool.
IEEE/CVF Winter Conference on Applications of Computer Vision, 2022, Hawaii, USA.
- [3] [CVPR 21] [Uncalibrated Neural Inverse Rendering for Photometric Stereo of General Surfaces](#).
Berk Kaya, Suryansh Kumar, Carlos Oliveira, Vittorio Ferrari, Luc Van Gool.
IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2021, Tennessee, USA.
- [4] [TPAMI 21] [Superpixel Soup: Monocular Dense 3D Reconstruction of a Complex Dynamic Scene](#).
Suryansh Kumar, Yuchao Dai, Hongdong Li.
IEEE, Transactions on Pattern and Machine Intelligence, IEEE, 2019.
- [5] [WACV 20] [Non-rigid Structure from Motion: Prior-Free Factorization Method Revisited](#).
Suryansh Kumar.
IEEE/CVF Winter Conference on Applications of Computer Vision, 2020, Colorado, USA.
- [6] [CVPR 19] [Jumping Manifolds: Geometry Aware Dense Non-Rigid Structure from Motion](#).
Suryansh Kumar.
IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2019, California, USA.
- [7] [CVPR 18] [Scalable Dense Non-rigid Structure from Motion: A Grassmannian Perspective](#).
Suryansh Kumar, Anoop Cherian, Yuchao Dai, Hongdong Li.
IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2018, Utah, USA.
- [8] [ICCV 17] [Monocular Dense 3D Reconstruction of a Dynamic Scene from Two Perspective Images](#).
Suryansh Kumar, Yuchao Dai, Hongdong Li.
IEEE/CVF International Conference on Computer Vision, IEEE, 2017, Venice, Italy.
- [9] [PR 17] [Spatio-Temporal Union of Subspaces for Multi-body Non-rigid Structure-from-Motion](#).
Suryansh Kumar, Yuchao Dai, Hongdong Li.
Elsevier, Pattern Recognition Journal, 2017.
- [10] [3DV 16] [Multi-body Non-rigid Structure from Motion](#).
Suryansh Kumar, Yuchao Dai, Hongdong Li.
IEEE, International Conference on 3D Vision, 2016, Stanford University, California, USA.

Core Machine Learning and AI

- [1] [IJCAI 21] [Neural Architecture Search of SPD Manifold Networks](#).
Rhea Sukthanker, Zhiwu Huang, Suryansh Kumar, Erik G. Endsjo, Yan Wu, Luc Van Gool.
International Joint Conference on Artificial Intelligence, 2021, Montreal, Canada.

Robotics

- [1] [ICRA 14] [Markov Random Field based Small Obstacle discovery over Images](#).
Suryansh Kumar, Siva Karthik M, K. Madhava Krishna.
IEEE, International Conference on Robotics and Automation, 2014, Hong Kong, China.
- [2] [ICPR 14] [Small object discovery and recognition using actively guided robot](#).
Sudhanshu Mittal, Siva Karthik M, Suryansh Kumar, K. Madhava Krishna.
International Conference on Pattern Recognition, IEEE, 2014, Stockholm, Sweden.
- [3] [VPPC 14] [An open framework for human-like autonomous driving using Inverse RL](#).
Dizan Vasquez, Yufeng Yu, Suryansh Kumar, Christian Laugier.
IEEE, Vehicle Power and Propulsion Conference, 2014, Coimbra, Portugal.

- [4] [\[ICVGIP 14\] CRF Based Frontier Detection using Monocular Camera.](#)
Sarthak Upadhyay, Suryansh Kumar, K. Madhava Krishna.
ACM, 2014, IISc Bangalore, India.
- [5] [\[ICVGIP 12\] A Bayes filter based adaptive floor segmentation with homography and appearance cues.](#)
Suryansh Kumar, Ayush Dewan, K. Madhava Krishna.
ACM, 2012, IIT-Bombay, India.

Thesis

- [1] [Non-rigid Structure from Motion.](#)
Suryansh Kumar.
Ph.D. Thesis, Australian National University.

Preprints and Technical Report

- [1] [Dense Non-Rigid Structure from Motion: A Manifold Viewpoint.](#)
Suryansh Kumar, Luc Van Gool, Carlos Oliveira, Anoop Cherian, Yuchao Dai, Hongdong Li.
arXiv Preprint 2020.
- [2] [Dense Depth Estimation of a Complex Dynamic Scene without Explicit 3D Motion Estimation.](#)
Suryansh Kumar, Ram Srivatsav Ghorakavi, Yuchao Dai, Hongdong Li, Luc Van Gool.
arXiv Preprint 2019.

RECENT TALK

- ETH Zürich “Non-Rigid Structure-from-Motion.” Dec. 2019.
Host: Computer Vision Lab, D-ITET, ETH Zürich.
- Dynavis CVPR 2019, “Jumping Manifold.” June 2019.
Host: Armin Mustafa, Marco Volino, Michael Zollhöfer, Dan Casas, Adrian Hilton.
- Australian National University, “Non-Rigid Structure from Motion.” Mar. 2019.
Host: Hongdong Li, Yuchao Dai.
- Samsung Research America, “Dynamic Scene 3D Reconstruction.” Jan. 2019.
Host: Shalini Ghosh.

SERVICE AND PROFESSIONAL ACTIVITIES

- **Journal Reviewer:** T-PAMI, IJCV, Pattern Recognition, AURO.
- **Conference Reviewer:** ICLR, CVPR, ECCV, ICRA, IROS, 3DV, ICCV.
- **TA, Computer Vision Course.** (ENGN4528/6528) [Feb. 2018 - July 2018.]
Course Instructor: Hongdong Li.
- **TA, Individual Engineering Project Course.** (ENGN4200) [Feb. 2017 - July 2017.]
Course Instructor: Yuchao Dai.
- **TA, Computer Vision Course.** (ENGN4528/6528) [Feb. 2017 - July 2017.]
Course Instructor: Jonghyuk Kim.

STUDENTS AND COLLABORATORS

- **Current Students.**
 - Timo Kleger (B.S) [Sept. 21 -]
 - Noah Rothenberger (M.S) [Sept. 21 -]
 - Weirong Chen (M.S) [Sept. 21 -]
 - Guohao Li (KAUST visiting researcher) [May. 21 -]
 - Sarno Francesco (Intern) [May. 21 -]
 - Jiahao Wang (M.S) [May. 21 -]

- Berk Kaya (Ph.D) [Nov. 19 -]
- Erik Sandström (Ph.D) [Nov. 19 -]
- **Past Students.**
 - Valentin Ibars (M.S) [Feb. 21 - Jun. 21]
 - Sukthanker Rhea (M.S) [Oct. 20 - May. 21]
 - Sarno Francesco (M.S) [Oct. 20 - Mar. 21]
 - Menini Davide (M.S) [Oct. 20 - Mar. 21]
 - Serafino Samuele (M.S) [Sep. 20 - Nov. 20]
 - Yan Wu (M.S) [Aug. 20 - Oct. 20]
 - Sukthanker Rhea (M.S) [Mar. 20 - Jun. 20]
 - Erik Endsjo Goron (M.S) [Mar. 20 - Jun. 20]
- **Collaborators.**
 - Fisher Yu [Topic: Visual Intelligence and Robotic Arm.]
 - Radu Timofte [Topic: Deep-Learning for Image and Video Enhancement.]
 - Zhiwu Huang [Topic: Deep-Learning for Image and Video Enhancement.]
- **External Informal Collaborators.**
 - Yang Xiao, Dept. of Mathematics ETH. [Topic: Number Theory.]
 - Nishant Jain, CSE IIT-Roorkee. [Topic: View Synthesis.]

RESEARCH INTERESTS

- **Computer Vision:** Structure from Motion, Photometric Stereo, Multiview Stereo.
- **Robotics:** State Estimation, Camera Calibration, Visual SLAM.
- **Mathematics:** Mathematical Optimisation, Compressed Sensing, Topological Manifolds.
- **Machine Learning:** Neural Architecture Search, Graph Neural Networks.
- **Others:** Discrete Differential Geometry.

TECHNICAL SKILL SET

- **Programming Language:** C/C++, Python.
- **Scripting Language:** Matlab, Octave, Unix Shell Programming.
- **Libraries and APIs:** OpenCV, OpenGL, ROS, Eigen, STL, Numpy, Scipy, Pangolin.
- **Deep Neural Network Framework:** PyTorch.
- **Web and Documentation:** HTML, CSS, L^AT_EX.
- **Others:** Embedded C, Unix System Programming.