# YIFU WANG

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Education

**Australian National University**                                      Australia
*Doctor of Philosophy, Engineering and Computer Science*        *Mar. 2016 – Nov. 2020*
- Advisor: Associate Prof Laurent Kneip and Prof Hongdong Li

**Australian National University**                                      Australia
*B. Eng. Hons Electronics and Communications*                   *Feb. 2014 – Dec. 2015*

**Beijing Institute of Technology**                                        China
*B. Eng. Hons Automation*                                       *Sep. 2011 – Jul. 2015*

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Research Experience

**Volumetric contrast maximization for event camera**          Jan 2020 – Oct 2020
*In Submission*
- contrast maximization is restricted to a image-to-image warping function
- maximizes the contrast via smooth motion parameters in a volumetric ray density field
- validated on AGV motion estimation case and outperforms regular camera solution

**Dynamic event camera calibration**                          Aug 2020 – Nov 2020
*Submitted to IROS 2021*
- event camera calibration methods require flashing patterns but difficult to construct or use
- a novel pattern extraction methods and b-spline based multi-segment optimization
- presents a fast and accurate event-based calibration method on regular calibration board

**Bundle adjustment for AGV by using b-splines**              Jan 2019 – Jun 2020
*Published paper in ICRA 2021*
- conventional bundle adjustment does not use the kinematic motion constraints of AGV
- uses b-spline parametrization and non-holonomic kinematic constraints in bundle adjustment
- strongly improves accuracy and robustness of monocular visual odometry for AGV

**Globally-optimal event camera motion estimation**          Jul. 2019 – Apr. 2020
*Published paper in ECCV 2020 and T-PAMI 2021*
- contrast maximisation framework is non-convex, which is sensitive to the initial guess
- uses Branch and Bound method to solve the global maximisation of contrast functions
- applies to different scenario, and significantly outperforms incremental local refinement

**Motion estimation for surround-view camera systems**       Dec. 2018 – Jun. 2019
*Published paper in ICRA 2020*
- a generalized planar motion solver for multiple cameras appears as a gap in the literature
- formulates epipolar geometry as an uni-variate, multi-eigenvalue minimization problem
- presents a highly accurate and reliable motion estimation for surround-view camera systems

**Motion estimation for AGV over multiple views**            Jul. 2018 – Dec. 2018
*Published paper in CVPR 2019*
- 1-point Ransac method is restricted to two views and unable to handle line correspondences
- extends the planar tri-focal tensor to multiple views and uses the Ackermann motion model
- outperforms 1-point Ransac when the Ackermann constraint is well fulfilled

**Visual odometry for non-overlapping multi-camera systems**   Apr. 2016 – Mar. 2017
*Published paper in ICVS 2017*
- non-overlapping multi-camera systems are easily affected by motion degeneracies that cause scale unobservabilities
- solves scaled translations and point depths through a closed-form, linear initialization approach
- presents a novel initialization method and a complete pipeline for non-overlapping MPC systems

## Publications

K Huang, **Y Wang** and L Kneip. B-splines for Purely Vision-based Localization and Mapping on Non-holonomic Ground Vehicles, *In Proceedings of the 2021 IEEE International conference on robotics and automation (ICRA)*, Jun. 2021.

X. Peng, L. Gao, **Y Wang** and L. Kneip. Globally-Optimal Contrast Maximisation for Event Cameras, *In IEEE Transactions on Pattern Analysis and Machine Intelligence*, Jan. 2021.

X Peng*, **Y Wang**\*, L Gao* and L Kneip. Globally-Optimal Event Camera Motion Estimation. *In Proceedings of the European Conference on Computer Vision (ECCV)*, Aug. 2020. **(co-first author)**

**Y Wang**, K Huang, X Peng, H Li and L Kneip. Reliable frame-to-frame motion estimation for vehicle-mounted surround-view camera systems. *In Proceedings of the 2020 IEEE International conference on robotics and automation (ICRA)*, Jun. 2020.

K Huang, **Y Wang** and L Kneip. Motion estimation of non-holonomic ground vehicles from a single feature correspondence measured over n views. *In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition(CVPR)*, Jun. 2019.

**Y Wang** and L Kneip. On scale initialization in non-overlapping multi-perspective visual odometry. *In Proceedings of the International Conference on Computer Vision Systems*, Shenzhen, Jul 2017. **Best Student Paper Award**

## Internship and Visiting history

**Consultant**                                                            Oct. 2020 – Present
*Stereye Intelligent Technologies*                                        *Shanghai, China*
- Part-time consultant at SLAM Group of Stereye Intelligent Technologies.

**Visiting Researcher**                                                   Jul. 2018 – Present
*ShanghaiTech University*                                                 *Shanghai, China*
**Intern**                                                               Jul 2019 –Aug 2019
*Motovis Intelligent Technologies*                                        *Shanghai, China*
- Internship at v-SLAM Group of Motovis Intelligent Technologies.

## Honors and Awards

**Third Prize Winner**                                                            Dec 2020
*3rd Innovation and Entrepreneurship Summit of ShhanghaiTech University*
- Our project **"ARGUS.AI: Super vision for machines"** won the third prize and 10,000 CNY in startup funds.

**Best Student Paper Award**                                                      Jul 2017
*International Conference on Computer Vision Systems 2017*

## Peer Reviews

International Conference on Robotics and Automation **(ICRA)** 2020, 2021
Conference on Computer Vision and Pattern Recognition **(CVPR)** 2020
International Conference on Computer Vision **(ICCV)** 2021

Skills

**Programming Languages**: C/C++, Matlab, TeX
**Human Languages**: Mandarin, English
**Developer Tools**: Git, CLion, Matlab, OpenCV, Ceres, ROS, Most MS Office products.
**Platforms Tools**: Windows, Ubuntu, Mac OS.
**General Business Skills**: Strong sense of responsibility, good at communication and team work.