

# Xieyuanli Chen

RESEARCH ASSISTANT · PHOTOGRAMMETRY & ROBOTICS LAB

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## Research Interests

**Main Areas:** SLAM, Localization, Scene Understanding, Robot Learning

**Applications:** Autonomous Vehicle; Rescue Robotics

## Education

**Dr.-Ing. (Ph.D. in Engineering) - *summa cum laude* (with distinction, best possible grade)**

University of Bonn, SUPERVISOR: Prof. Dr. Cyrill Stachniss

THESIS: LiDAR-Based Semantic Perception for Autonomous Vehicles

09.2018 - 08.2022

Bonn, Germany

**M.S. in Robotics**

National University of Defense Technology, SUPERVISOR: Prof. Dr. Hui Zhang

THESIS: Binary Visual Feature-based Monocular SLAM

09.2015 - 12.2017

Hunan, China

**B.S. in Electrical Engineering and Automation**

Hunan University, SUPERVISOR: Prof. Dr. Jianhao Tan, Prof. Dr. Yaonan Wang

THESIS: Control for a Quadrotor UVA

09.2011 - 07.2015

Hunan, China

## Research Experience

### ACADEMIC WORKING EXPERIENCE

**Associate Editor**

IEEE International Conference on Robotics and Automation

09.2022 - Present

**Associate Editor**

IEEE Robotics and Automation Letters (RA-L)

09.2022 - Present

**Research Assistant**

Photogrammetry & Robotics Lab, University of Bonn

11.2019 - 08.2022

### RESEARCH COMMITTEE MEMBERSHIP

**Technical Committee**

RoboCup Rescue Robot League

07.2019 - Present

**Organizing Committee**

Robotics: Science and Systems (RSS) Pioneers 2022

07.2021 - 07.2022

**Programme Committee**

RoboCup Symposium 2022

04.2022 - 07.2022

**Organizing Committee**

RoboCup Rescue Robot League

07.2017 - 07.2019

## Research Indices

**GoogleScholar · h-index: 13 · i10-index: 14 · Number of citations: 600+**

All indices determined using GoogleScholar with ID DvrngV4AAAAJ

08.09.2022

**GitHub · open-source projects: 18 · stars: 3000+ · forks: 700+**

08.09.2022

## Honors & Awards

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<b>RSS Pioneer</b> Robotics: Science and Systems (RSS)	2021
<b>Finalist of Best System Paper</b> Robotics: Science and Systems (RSS)	2020
<b>Best-in-Class Search and Inspect</b> Rescue Robot League (RRL), RoboCup	2022
<b>Best-in-Class Exploration and Mapping Scenario</b> Rescue Robot League (RRL), RoboCup	2022
<b>Best-in-Class Exploration and Mapping</b> Rescue Robot League (RRL), RoboCup	2021
<b>Ph. D. Student Scholarship</b> China Scholarship Council (CSC)	2018
<b>In recognition of Exceptional Performance as Associate Judge</b> Rescue Robot League (RRL), RoboCup	2017
<b>Winner of Rescue Robot Competition</b> IEEE Intl. Sym. on Safety, Security, and Rescue Robotics (SSRR)	2017
<b>Best-in-Class Small Robot Mobility</b> Rescue Robot League (RRL), RoboCup	2016

## Teaching Experience

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<b>Master Project: Visual LiDAR Odometry</b> Project, MSC	2020
<b>Advanced Techniques in Mobile Sensing and Robotics Course</b> Lecture, MSC	2020
<b>Master Project: Semantic Place Categorization</b> Project, MSC	2019
<b>Sensors and State Estimation Course</b> Lecture, MSC	2019

## Student Supervision as Responsible Supervisor

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<b>Master Thesis: Deep Learning-based Pole Extractor for Long-term LiDAR Global Localization</b> Student Name: Hao Dong	2022
<b>Intern Project: LiDAR-based Long-term Place Recognition</b> Student Name: Junyi Ma	2022
<b>Intern Project: LiDAR-based Moving Object Segmentation</b> Student Name: Jiadai Sun	2022
<b>Intern Project: Static Map Generation from Point Cloud Data</b> Student Name: Mehul Arora	2021
<b>Intern Project: Pole-based LiDAR Localization</b> Student Name: Hao Dong	2021
<b>Bachelor Thesis: Extracting Color and Semantic Information for LiDAR Point Clouds from Images</b>	2020

## Publication List

### PEER-REVIEWED JOURNAL ARTICLES

- [1] **X. Chen**, B. Mersch, L. Nunes, R. Marcuzzi, I. Vizzo, J. Behley, and C. Stachniss. Automatic Labeling to Generate Training Data for Online LiDAR-Based Moving Object Segmentation. *IEEE Robotics and Automation Letters (RA-L)*, 7(3):6107–6114, 2022
- [2] **X. Chen**, T. Labe, A. Milioto, T. Rohling, J. Behley, and C. Stachniss. OverlapNet: A Siamese Network for Computing LiDAR Scan Similarity with Applications to Loop Closing and Localization. *Autonomous Robots*, 46:61–81, 2022
- [3] J. Ma, J. Zhang, J. Xu, R. Ai, W. Gu, C. Stachniss, and **X. Chen**. OverlapTransformer: An Efficient and Rotation-Invariant Transformer Network for LiDAR-Based Place Recognition. *IEEE Robotics and Automation Letters (RA-L)*, 2022
- [4] B. Mersch, **X. Chen**, I. Vizzo, L. Nunes, J. Behley, and C. Stachniss. Receding Moving Object Segmentation in 3D LiDAR Data Using Sparse 4D Convolutions. *IEEE Robotics and Automation Letters (RA-L)*, 2022
- [5] T. Guadagnino, **X. Chen**, M. Sodano, J. Behley, G. Grisetti, and C. Stachniss. Fast Sparse LiDAR Odometry Using Self-Supervised Feature Selection on Intensity Images. *IEEE Robotics and Automation Letters (RA-L)*, 2022
- [6] S. Li, **X. Chen**, Y. Liu, D. Dai, C. Stachniss, and J. Gall. Multi-scale Interaction for Real-time LiDAR Data Segmentation on an Embedded Platform. *IEEE Robotics and Automation Letters (RA-L)*, 7(2):738–745, 2022
- [7] L. Nunes, **X. Chen**, R. Marcuzzi, A. Osep, L. Leal-Taixe, C. Stachniss, and J. Behley. Unsupervised Class-Agnostic Instance Segmentation in LiDAR Data for Autonomous Vehicles. *IEEE Robotics and Automation Letters (RA-L)*, 2022
- [8] L. Nunes, R. Marcuzzi, **X. Chen**, J. Behley, and C. Stachniss. SegContrast: 3D Point Cloud Feature Representation Learning through Self-supervised Segment Discrimination. *IEEE Robotics and Automation Letters (RA-L)*, 7(2):2116–2123, 2022
- [9] H. Dong, **X. Chen**, and C. Stachniss. Online Pole Segmentation on Range Images for Long-term LiDAR Localization in Urban Environments. *Journal on Robotics and Autonomous Systems (RAS)*, 2022
- [10] M. Arora, L. Wiesmann, **X. Chen**, and C. Stachniss. Static Map Generation from 3D LiDAR Point Clouds Exploiting Ground Segmentation. *Journal on Robotics and Autonomous Systems (RAS)*, 2022
- [11] **X. Chen**, S. Li, B. Mersch, L. Wiesmann, J. Gall, J. Behley, and C. Stachniss. Moving Object Segmentation in 3D LiDAR Data: A Learning-based Approach Exploiting Sequential Data. *IEEE Robotics and Automation Letters (RA-L)*, 6:6529–6536, 2021
- [12] C. Shi, **X. Chen**, K. Huang, J. Xiao, H. Lu, and C. Stachniss. Keypoint Matching for Point Cloud Registration using Multiplex Dynamic Graph Attention Networks. *IEEE Robotics and Automation Letters (RA-L)*, 6:8221–8228, 2021
- [13] L. Wiesmann, A. Milioto, **X. Chen**, C. Stachniss, and J. Behley. Deep Compression for Dense Point Cloud Maps. *IEEE Robotics and Automation Letters (RA-L)*, 6:2060–2067, 2021

### PEER-REVIEWED CONFERENCE PAPERS

- [1] J. Sun, Y. Wang, M. Feng, D. Wang, J. Zhao, C. Stachniss, and **X. Chen**. ICK-Track: A Category-Level 6-DoF Pose Tracker Using Inter-Frame Consistent Keypoints for Aerial Manipulation. In *Proc. of the IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, 2022
- [2] J. Sun, Y. Dai, X. Zhang, J. Xu, R. Ai, W. Gu, C. Stachniss, and **X. Chen**. Efficient Spatial-Temporal Information Fusion for LiDAR-Based 3D Moving Object Segmentation. In *Proc. of the IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, 2022
- [3] **X. Chen**, I. Vizzo, T. Labe, J. Behley, and C. Stachniss. Range Image-based LiDAR Localization for Autonomous Vehicles. In *Proc. of the IEEE Intl. Conf. on Robotics & Automation (ICRA)*, 2021
- [4] I. Vizzo, **X. Chen**, N. Chebrolu, J. Behley, and C. Stachniss. Poisson Surface Reconstruction for LiDAR Odometry and Mapping. In *Proc. of the IEEE Intl. Conf. on Robotics & Automation (ICRA)*, 2021
- [5] A. Reinke, **X. Chen**, and C. Stachniss. Simple But Effective Redundant Odometry for Autonomous Vehicles. In *Proc. of the IEEE Intl. Conf. on Robotics & Automation (ICRA)*, 2021
- [6] M. Zhou, **X. Chen**, N. Samano, C. Stachniss, and A. Calway. Efficient localisation using images and openstreetmaps. In *Proc. of the IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, 2021
- [7] B. Mersch, **X. Chen**, J. Behley, and C. Stachniss. Self-supervised Point Cloud Prediction Using 3D Spatio-temporal Convolutional Networks. In *Proc. of the Conf. on Robot Learning (CoRL)*, 2021

- [8] H. Dong, **X. Chen**, and C. Stachniss. Online Range Image-based Pole Extractor for Long-term LiDAR Localization in Urban Environments. In *Proc. of the Europ. Conf. on Mobile Robotics (ECMR)*, 2021
- [9] M. Arora, L. Wiesmann, **X. Chen**, and C. Stachniss. Mapping the Static Parts of Dynamic Scenes from 3D LiDAR Point Clouds Exploiting Ground Segmentation. In *Proc. of the Europ. Conf. on Mobile Robotics (ECMR)*, 2021
- [10] **X. Chen**, T. Läbe, A. Milioto, T. Röhling, O. Vysotska, A. Haag, J. Behley, and C. Stachniss. OverlapNet: Loop Closing for LiDAR-based SLAM. In *Proc. of Robotics: Science and Systems (RSS)*, 2020
- [11] **X. Chen**, T. Läbe, L. Nardi, J. Behley, and C. Stachniss. Learning an Overlap-based Observation Model for 3D LiDAR Localization. In *Proc. of the IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, 2020
- [12] **X. Chen**, A. Milioto, E. Palazzolo, P. Giguère, J. Behley, and C. Stachniss. SuMa++: Efficient LiDAR-based Semantic SLAM. In *Proc. of the IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, 2019