Mengkun She

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EDUCATION

- **Christian-Albrechts-Universität zu Kiel** — Kiel, Germany
  Ph.D. in Computer Science — *Nov 2020 – May 2025*
  - **Topic**: Underwater Refractive Camera Calibration and 3D Scene Reconstruction
  - **Advisor & Reference**: Prof. Dr. -Ing. Kevin Köser

- **Chongqing University** — Chongqing, China
  Master of Science in Surveying and Mapping Engineering (Geo-informatics) — *Sep 2017 – June 2020*

- **Chongqing University** — Chongqing, China
  Bachelor of Science in Surveying and Mapping Engineering (Geo-informatics) — *Sep 2013 – June 2017*

EXPERIENCE

- **Dandy – Digital Dental Lab** — New York, US
  Computer Vision Research Engineer — *June 2025 – Present*
  - **Shade Capture**: Research and develop methodologies to capture the geometry and radiometric properties of human teeth/crowns/dentures using image-based 3D modeling and inverse rendering.

- **Christian-Albrechts-Universität zu Kiel** — Kiel, Germany
  Computer Vision Research Assistant at Marine Data Science Group (MDS) — *July 2023 – May 2025*
  - **Open-Source C++ Underwater Mapping Software**: Integrate the refractive camera models and refractive SfM into the popular C++ based open-source 3D reconstruction software COLMAP. (project link: gitlab:colmap-underwater)
  - **Underwater Neural Radiance Field**: Learning a medium- and light-independent scene representation by modeling the camera-attached co-moving light source with spatial- and surface normal-dependent neural network (paper: [1]).
  - **Tiny- and Semi-transparent Object Reconstruction**: Learning a volumetric representation for tiny- and semi-transparent objects using differentiable rendering and neural radiance field (paper: [8]).
  - **Teaching Assistant - Probabilistic Robotics (Winter 2023)**: Responsible for the tutorial sessions and the final exam.

- **Helmholtz Centre for Ocean Research, Kiel, GEOMAR** — Kiel, Germany
  Computer Vision Research Assistant at Oceanic Machine Vision Group (OMV) — *Nov 2020 – June 2023*
  - **Refractive Camera Models and Calibration**: Derive and implement novel camera models for underwater camera systems to account for geometric distortion induced by refraction (paper [5, 7]).
  - **Refractive Image-based 3D Reconstruction**: Research and develop a refractive structure-from-motion (SfM) approach for image-based 3D reconstruction from underwater imagery (paper [2]).
  - **Sensor Fusion with Navigation**: Develop a loosely-coupled visual-navigation fusion strategy for mapping a large-scale of seafloor (paper: [3]).
  - **Macro-lens Camera Calibration**: Derive a novel affine transform camera model for the focus-stacked image and develop a C++ based calibration approach for macro-lens camera system (paper: [6]).

- **Helmholtz Centre for Ocean Research, Kiel, GEOMAR** — Kiel, Germany
  Internship & Master Thesis — *Jan 2019 – Jan 2020*
  - **BubbleBox Project**: Develop a synchronized high-speed (80 Hz) machine vision stereo camera system. Develop a C++ based software to measure and quantify the volumes of released gas bubbles using image processing and stereo vision techniques.

- **Computer Vision Freelancer** — Kiel, Germany
  Working as a freelancer to offer small-to-medium size computer vision services and solutions — *2021 – 2024*
  - **Localizing Robot Arm End Effector**: Develop a synchronized 4-camera system to track and localize the end effector of a robot arm in 3D using AruCo maker.
  - **Intrinsic & Extrinsic Calibration of a Camera Array**: Develop a calibration method to calibrate the intrinsic and relative extrinsic parameters of a 26-cameras camera array for medical human-body scanning.

Skills

- **Skill Set**: Camera Calibration; 3D Reconstruction; SfM / SLAM; Estimation and Optimization; Representation Learning; Inverse Rendering

- **Programming & Tools**: C++, CMake, Python, PyTorch, OpenCV, Ceres-Solver, Linux, Git, ROS (basic), LaTex

- **Scientific Skills**: Problem Solving; Modeling; Scientific Drawing and Writing.

- **Communication**: English (proficient); German (basic); Chinese (native)

Certificate

- **Algorithmic Toolbox**: Issued by Coursera, credential ID: PX5W3GZW8QLW

- **Neural Networks and Deep Learning**: Issued by Coursera, credential ID: 6ML6ZBMNEXXU

- **Improving Deep Neural Networks**: Issued by Coursera, credential ID: JVRXWMCD4LHH

Awards & Scholarship

- **Ph.D. Scholarship**: Doctoral scholarship granted by China Scholarship Council (CSC, 2020 – 2024)

- **Travel Grant**: Travel grant for young researchers by Deutsche Arbeitsgemeinschaft für Mustererkennung, DAGM 2019

Selected Publications

18 publications listed on Google Scholar, with a total of 232 citations and an H-index of 8. Below are selected publications:

- [**1**]: **M. She**, F. Seegräber, D. Nakath, P. Schöntag, K. Köser. Relative Illumination Fields: Learning Medium and Light Independent Underwater Scenes. In *ICCV, 2025*

- [**2**]: **M. She**, F. Seegräber, D. Nakath, K. Köser. Refractive COLMAP: Refractive Structure-from-Motion Revisited. In *IROS, 2024* (**Oral**)

- [**3**]: **M. She**, Y. Song, D. Nakath, K. Köser. Semihierarchical Reconstruction and Weak-area Revisiting for Robotic Visual Seafloor Mapping. In *Journal of Field Robotics*

- [**4**]: **M. She**, T. Weiß, Y. Song, P. Urban, J. Greinert, K. Köser. Marine Bubble Flow Quantification Using Wide-baseline Stereo Photogrammetry. In *ISPRS Photogrammetry and Remote Sensing*

- [**5**]: **M. She**, D. Nakath, Y.Song, K. Köser. Refractive Geometry on Underwater Domes. In *ISPRS Photogrammetry and Remote Sensing*

- [**6**]: X. Weng*, **M. She***, D. Nakath, K. Köser (**Equal Contribution*). Macal - Macro Lens Calibration and the Focus Stack Camera Model. In *3DV, 2021* (**Oral**)

- [**7**]: **M. She**, Y. Song, J Mohrmann, K. Köser. Adjustment and Calibration of Dome Port Camera Systems for Underwater Vision. In *GCPR, 2019* (**Oral**)

- [**8**]: D. Nakath, X. Weng, **M. She**, K. Köser. Visual Tomography: Physically Faithful Volumetric Models of Partially Translucent Objects. In 3DV, 2024