Contact & links

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Languages

Spanish: Native
English: Adv. (C1)
German: Adv. (B2)
Italian: Basic (A2)

Skills

AI, Deep Learning, NeRF, Remote Sensing, Differentiable Rendering, Scene Understanding, 3D geometry, SLAM

Programming

Languages
Python, C/C++
Libraries
PyTorch, OpenCV, ROS, sklearn, Pandas

References

Prof. Chris McCool
University of Bonn
csmccool1@gmail.com

Mario Munich
Embodied, Inc.
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Juan Tarrio
SLAMCore, Ltd.
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Prof. Sol Pedre
CAREM25, CNEA
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ClausSmitt

AI Perception Roboticist

Education

2020-2024 **PhD. Engineering (summa cum laude)** — **University of Bonn, Germany**
Thesis: Robotic Vision for Precision Intervention in Horticulture.

2014-2016 **Master of Engineering** — **Instituto Balseiro, Argentina**
Thesis: Haptic telemanipulator for industrial robot arms.

2008-2014 **Electrical Engineer** — **Universidad Nacional de Rosario, Argentina**
Thesis: Active vibration cancelling for parallel robots.

2005-2007 **Electrical Technician** — **Colegio San José Nº 8013, Argentina**

Experience

Since 02/25 **Senior Machine Learning Scientist** — **Degas Ltd., Tokyo, Japan**
Satellite-based geospatial foundation models for agriculture and natural disaster detection.

05/24-01/25 **State Estimation Engineer** — **Outrider, CO, USA**
Vision and LiDAR perception onboard autonomous trucks for yard operation.

01/20-04/24 **Research Assistant** — **University of Bonn, Germany**
Deep learning perception systems & neural rendering for agricultural robotics.
Phenorob cluster of excellence partner.

01/19-12/19 **Computer Vision Trainee** — **iRobot, CA, USA**
Visual SLAM & Sensor Fusion algorithms for consumer robots.

09/16-12/18 **R&D Engineer** — **CNEA, Bariloche, Argentina**
Edge-based monocular SLAM system for UAVs.
Robot automation of inspection systems.

03/13-07/13 **Intern** — **KUKA Labs, Augsburg, Germany**
System test and software tools for collaborative robots evaluation.

10/12-02/13 **Reaserch Intern** — **University of Braunshweig, Germany**
Multi-body modelling of parallel robots vibratory behaviour.

10/12-02/13 **Student assistant** — **University of Braunshweig, Germany**
PCB design and manufacturing for industrial cleaning robots.

Teaching

01/20-04/23 **Teaching Assistant** — **University of Bonn, Germany**
Courses: Python applied to Machine Learning; MSc Project Mobile Sensing & Robotics; MSc Project Technology & precision Farming

02/16-12/18 **Teaching Assistant** — **Instituto Balseiro, Argentina**
Courses: Signals & Systems; Digital Electronics.

Publications

F. Magistri, T. Läbe, E. Marks, S. Nagulavancha, Y. Pan, **C. Smitt**, L. Klingbeil, M. Halstead, H. Kuhlmann, C. McCool, J. Behley, C. Stachniss. "A Dataset and Benchmark for Shape Completion of Fruits for Agricultural Robotics", arXiv 2024

A. Ahmadi, M. Halstead, **C. Smitt**, C. McCool. "BonnBot-I Plus: A Bio-diversity Aware Precise Weed Management Robotic Platform", IEEE Robotics and Automation Letters (RA-L), to be presented at ICRA@40, 2024.

C. Smitt, M. Halstead, P. Zimmer, T. Läbe, E. Guclu, C. Stachniss, C. McCool. "PAg-NeRF: Towards fast and efficient end-to-end panoptic 3D representations for agricultural robotics", IEEE Robotics and Automation Letters (RA-L), presented at ICRA 2024.

Y. Pan, F. Magistri, T. Läbe, E. Marks, **C. Smitt**, C. McCool, J. Behley, C. Stachniss, "Panoptic Mapping with Fruit Completion and Pose Estimation for Horticultural Robots", presented at IROS 2023.

C. Smitt, M. Halstead, A. Ahmadi, C. McCool, "Explicitly Incorporating Spatial Information to Recurrent Networks for Agriculture", IEEE Robotics and Automation Letters (RA-L), presented at IROS 2022.

M. Halstead, A. Ahmadi, **C. Smitt**, O. Schmittmann, C. McCool, "Crop Agnostic Monitoring Driven by Deep Learning", Frontiers in plant science 12, 2021.

T. Zaenker, **C. Smitt**, C. McCool, M. Bennewitz, "Viewpoint Planning for Fruit Size and Position Estimation", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021.

C. Smitt, M. Halstead, T. Zaenker, M. Bennewitz, C. McCool, "PATHoBot: A Robot for Glasshouse Crop Phenotyping and Intervention", IEEE International Conference on Robotics and Automation (ICRA), 2021.

J. Tarrio, **C. Smitt**, S. Pedre. "SE-SLAM: Semi-Dense Structured Edge-Based Monocular SLAM", ArXiv 2019.

C. Smitt, C. Trujillo, J. Tarrio, S. Pedre. "Generic Embedded Drivers for Robotic Tele-Manipulator Joints". Proceedings of the 16º Reunión de Trabajo en Procesamiento de la Información y Control (RPIC), 2015.

Awards

2022	**Best Paper Award on Agricultural Robotics** **C. Smitt**, M. Halstead, A. Ahmadi, C. McCool. "Explicitly incorporating spatial information to recurrent networks for agriculture".	IROS 2022, Japan
2017	**Autonomous Multicopter Challenge - 1st place** J. Tarrio, **C. Smitt**, S. Pedre	IX Jornadas Argentinas de Robótica, Argentina
2014	**Best Student Paper** E. Battocchio, **C. Smitt**.	VIII Jornadas Argentinas de Robótica, Argentina

Academic Supervision

Master Thesis Supervision

Since 01/23	Fernando Blanco. *Semi-supervised panoptic segmentation for robot navigation in arable fields*.
10/22-05/23	Omar Eldahshoury. *Vision-Based Automation System to Prepare Harvested Lettuces for Packaging*.
07/17-07/18	Jimena Lopez Morillo. *Design of a robotic prosthetic hand & fabrication with 3D printing techniques*.

Master Course Project Supervision

04/21-03/22	Omar Eldahshoury. *Implementing an Enhanced Fruit Tracking System for Precision Agriculture*.
04/22-08/22	Erik Böholand, Jannik Boos. *3D Mapping a Glasshouse Environment over time*.
10/20-03/21	Lukas Gürtle. *Phenotyping Indices Estimation from Robot Collected NIR images*.
	Philip Blömeke. *Autonomously Detecting the End of a Crop Row Using a Sensor Array*.