Dominik Bauer

E-Mail — Homepage — GitHub — Scholar — LinkedIn

Education

2018 – 2022 **PhD in Robot Vision**, TU Wien
Dissertation: “Visually and Physically Plausible Object Pose Estimation For Robot Vision”, *with distinction*
Advisor: Markus Vincze
Committee: Markus Vincze, Federico Tombari, Markus Rupp

2015 – 2018 **Master in Visual Computing**, TU Wien
Thesis: “Evaluation of the Recognition Distances of Safety Signs in VR Considering Vision Impairments”, *with distinction*
Advisor: Michael Wimmer

2012 – 2015 **Bachelor in Media Informatics and Visual Computing**, TU Wien
“Development of a Stereo Video See-Through Head-Mounted Display”
Advisor: Hannes Kaufmann

Research Experience

since 03/2023 **Postdoctoral Researcher**, Columbia AI and Robotics Lab, Columbia University
PI of the FWF project *Making Sense of Objects from Exploratory Robotic Interaction*, investigating **continuous object and interaction learning**.
Advisor: Shuran Song

04/2022 – 02/2023 **Postdoctoral Researcher**, Vision for Robotics Lab, TU Wien
Investigated robot vision methods for **transparent & deformable objects** in the H2020 project *TraceBOT*, enabling traceable robotic manipulation.
Advisor: Markus Vincze

10/2018 – 03/2022 **Research Assistant**, Vision for Robotics Lab, TU Wien
Developed **object pose estimation** and verification methods for robotic grasping using learning-, simulation- and rendering-based approaches in the CHIST-ERA project *Heap* and the doctoral college *TrustRobots*.
Advisor: Markus Vincze

07/2016 – 08/2016 **Research Intern**, Virtual Reality Group, TU Wien and Illusion Walk
Implemented and optimized a GPU-based **multi-marker tracking** pipeline for large-scale VR applications, from camera input to pose output.
Advisor: Hannes Kaufmann

2014 – 2017 **Teaching Assistant**, Research Unit of Computer Graphics, TU Wien
Tutored courses in Computer Graphics and Virtual & Augmented Reality.
Advisors: Michael Wimmer, Hannes Kaufmann

Honors and Awards

2023 **Rückenwind Funding Bonus**, alpha+ Foundation

2022 **Erwin Schrödinger Fellowship**, Austrian Science Fund (FWF)

2018 **Distinguished Young Alumnus** of the Faculty of Informatics, TU Wien

2017 **Funding Grant**, TU Wien

2014 – 2017 **Merit Scholarship Grant**, TU Wien

Teaching Experience

summer 2014-2017	*Introduction to Visual Computing*, Teaching Assistant, lecture with exercise
winter 2016	*Virtual and Augmented Reality*, Teaching Assistant, lab exercise
winter 2014-2015	*Introduction to Computer Graphics*, Teaching Assistant, lab exercise

(Co-)Supervision

2022/23	*Object Pose Tracking using a Reinforced Agent*, Konstantin Röhrl, Master
2022/23	*Inverse Rendering for Transparent Object Pose Estimation*, Negar Layegh, Master
2021/22	*Evaluation of Vision-based Tactile Sensors*, Robert Tamás, Bachelor
2019/20	*Verification-based Grasping Pipeline for the Toyota HSR*, Stefan Spettel, Bachelor

Academic Service

Reviewing	ICRA, IROS, RSS, RA-L, IJCV, TMM
Committees	International Conference on Computer Vision Systems 2023, Publication Chair
Science Communication	Pint of Science 2022, Trust Robots lecture series, Responsible Robotics lecture

Selected Publications

Book Chapter	**Bauer, D.**, Patten, T., & Vincze, M. (2022). Visual and Physical Plausibility of Object Poses for Robotic Scene Understanding. In *Koeszegi, S. T., & Vincze, M. (Eds.). Trust in Robots, 81-103.* DOI: 10.34727/2022/isbn.978-3-85448-052-5.4
Conference Paper	**Bauer, D.**, Patten, T., & Vincze, M. (2021). ReAgent: Point Cloud Registration using Imitation and Reinforcement Learning. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 14586-14594*. DOI: 10.1109/CVPR46437.2021.01435
Journal Paper	**Bauer, D.**, Patten, T., & Vincze, M. (2020). VeREFINE: Integrating Object Pose Verification with Iterative Physics-guided Refinement. *IEEE Robotics and Automation Letters (RA-L), 5(3), 4289-4296.* DOI: 10.1109/LRA.2020.2996059

List of Publications

Bauer, D., Patten, T., & Vincze, M. (2022). **Visual and Physical Plausibility of Object Poses for Robotic Scene Understanding.** In *Koeszegi, S. T., & Vincze, M. (Eds.). Trust in Robots, 81-103.* DOI: 10.34727/2022/isbn.978-3-85448-052-5_4

Bauer, D., Patten, T., & Vincze, M. (2022). SporeAgent: Reinforced Scene-level Plausibility for Object Pose Refinement. *IEEE Winter Conference on Applications of Computer Vision (WACV), 196-204.* Code. DOI: 10.1109/WACV51458.2022.00027

Bauer, D., Patten, T., & Vincze, M. (2021). **ReAgent: Point Cloud Registration using Imitation and Reinforcement Learning.** *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 14586-14594*. Code. DOI: 10.1109/CVPR46437.2021.01435

Bauer, D.[*], Papagni, G.[*], Köszegi, S., & Vincze, M. (2021). A Study Design for Evaluation of Trust and Understandability through Interactive Multi-Modal Explanations of Robotic Failure. *HRI 2021 WYSD Workshop.*

Vincze, M., Patten, T., Park, K., & **Bauer, D.** (2020). Learn, detect, and grasp objects in real-world settings. *Elektrotechnik und Informationstechnik (e&i)*, 137(6), 324-330. DOI: 10.1007/s00502-020-00817-6

Bauer, D., Patten, T., & Vincze, M. (2020). Physical Plausibility of 6D Pose Estimates in Scenes of Static Rigid Objects. *European Conference on Computer Vision Workshops (ECCVW), 648-662.* Code. DOI: 10.1007/978-3-030-66096-3_43

Bauer, D., Patten, T., & Vincze, M. (2020). Scene Explanation through Verification of Stable Object Poses. *ICRA 2020 Workshop on Perception, Action, Learning: From Metric-Semantic Scene Understanding to High-level Task Execution.*

Bauer, D., Patten, T., & Vincze, M. (2020). **VeREFINE: Integrating Object Pose Verification with Iterative Physics-guided Refinement.** *IEEE Robotics and Automation Letters (RA-L), 5(3), 4289-4296. With oral presentation at IROS 2020.* Code. DOI: 10.1109/LRA.2020.2996059

Bauer, D., Patten, T., & Vincze, M. (2019). Monte Carlo Tree Search on Directed Acyclic Graphs for Object Pose Verification. *International Conference on Computer Vision Systems (ICVS), 386-396.* DOI: 10.1007/978-3-030-34995-0_35

Bauer, D., Patten, T., & Vincze, M. (2019). 6D Object Pose Verification via Confidence-based Monte Carlo Tree Search and Constrained Physics Simulation. *OAGM & ARW Joint Workshop, 153-158.* DOI: 10.3217/978-3-85125-663-5-31

Koller, M., **Bauer, D.**, de Pagter, J., Papagni, G., & Vincze, M. (2019). A Pilot Study on Determining the Relation between Gaze Aversion and Interaction Experience. *ACM/IEEE International Conference on Human-Robot Interaction (HRI), 644-645.* DOI: 10.1109/hri.2019.8673237

Krösl, K., **Bauer, D.**, Schwärzler, M., Fuchs, H., Suter, G., & Wimmer, M. (2018). A VR-based User Study on the Effects of Vision Impairments on Recognition Distances of Escape-route Signs in Buildings. *The Visual Computer, 34(6-8), 911-923.* DOI: 10.1007/s00371-018-1517-7

[*] Equal contribution.