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, IEEE Transactions on Multimedia
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.