

Patrick Michael Klokowski

Robotics Researcher | Core Inventor | Technical Team Lead

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Google Scholar: scholar.google.com/citations?user=4w4YfloAAAAJ

PROFESSIONAL PROFILE

Robotics researcher, core inventor, and technical team lead with approximately nine years of experience in high-dynamic autonomous robotics, robotic systems prototyping, and logistics automation. Specialized in feedback control, state estimation, trajectory generation, multi-robot coordination, fleet orchestration, system integration, and the transfer of robotic technologies from research prototypes toward industrial applications.

Core inventor and control-systems architect of LoadRunner, a patented high-speed autonomous transport-robot swarm for logistics, and evoBOT, a dynamically stable two-wheeled mobile manipulation robot.

Conceived and designed the overall control architectures and guided their integration into functional robotic prototypes, with subsequent component implementation performed partly by team members under technical direction and supervision.

Named inventor on 14 patent families documented through 48 published patent-application documents and approximately 50 granted national or regional patent rights, including eight granted U.S. patents. Current work combines doctoral research, experimental validation, prototype-to-industry technology transfer with BEUMER Group, and application of LoadRunner technology in a pilot project at a DPD parcel depot in Cologne, Germany.

PATENT PORTFOLIO AND INDUSTRIAL IMPACT

14 patent families | **8** granted U.S. patents | **~50** grants worldwide

48 published patent-application documents across the portfolio

Named inventor on 15 patent families, resulting in approximately 50 granted national or regional patent rights, including eight granted U.S. patents. The portfolio is additionally documented through 48 published patent-application documents.

The territorial grants and published application documents arise from the 15 patent families and do not represent separate inventions.

- Named inventor on 14 patent families in the current portfolio—13 associated with LoadRunner and one with evoBOT; 13 families have already resulted in at least one granted patent.
- The local portfolio contains 48 published A-/WO-application documents; this document count includes applications that later matured into grants and multiple publication stages and therefore does not represent 48 pending applications.
- Patent portfolio covers core technologies for high-dynamic autonomous logistics systems, including control, state estimation, trajectory generation, load handling, localization, routing, vehicle coordination, and fleet orchestration.
- The patented concepts reflect the overall control architecture personally conceived and designed for LoadRunner; assigned components were subsequently implemented by team members under technical direction and supervision.
- Technology is progressing through industrialization work with BEUMER Group and has been applied in a DPD pilot project in Cologne.

PROFESSIONAL APPOINTMENTS

Team Lead – High-Dynamic System Control — Fraunhofer IML

October 2021–Present

Dortmund, Germany

- Lead research and development activities involving control systems for high-dynamic autonomous robots.
- Serve as one of the core inventors of LoadRunner and lead technical work on its integrated autonomous control architecture.
- Personally conceived and designed the architecture for feedback control, state estimation, trajectory generation, and fleet orchestration.

- Define implementation tasks and provide technical direction and supervision to team members responsible for implementing components within the architecture.
- Provide technical leadership in transferring and adapting LoadRunner technology from a research prototype toward industrial applications with BEUMER Group.
- Supported application of the technology in a pilot project at a DPD facility in Cologne, Germany.

Research Associate – Applied Robotics for Logistics — Fraunhofer IML *January 2019–Present*
Dortmund, Germany

- Conduct applied research on high-dynamic autonomous transport systems and robotics for logistics applications.
- Developed the system-level concepts underlying LoadRunner's control, estimation, trajectory-generation, and fleet-orchestration architecture.
- Developed and integrated robotic prototypes and supported their transfer from laboratory research to real-world logistics environments.
- Serve as one of the core inventors of evoBOT and personally conceived and designed its overall control architecture.
- Named inventor on 15 patent families in the current portfolio: 14 associated with LoadRunner and one with evoBOT.

Research Associate – Applied Robotics — TU Dortmund University *November 2016–January 2019*
Dortmund, Germany

- Helped establish a major robotics research and experimentation facility.
- Brought one of Germany's largest Vicon motion-capture systems into operation, currently comprising more than 50 cameras.
- Helped establish reliable system operation through integration, calibration, troubleshooting, and experimental validation, and trained colleagues to use the infrastructure independently.
- Contributed to the facility's first major research project: a coordinated swarm of up to 12 drones.
- Conducted experimental work in autonomous robotics, multi-agent systems, and system control.

SELECTED RESEARCH AND TECHNOLOGY CONTRIBUTIONS

LoadRunner — Patented High-Speed Autonomous Transport-Robot Swarm

- One of the core inventors and architect of the overall control system.
- Personally conceived and designed the integrated architecture for feedback control, state estimation, trajectory generation, and multi-vehicle fleet orchestration.
- Directed and supervised team members implementing assigned components within the architecture.
- Named inventor on 13 associated patent families within a 14-family robotics portfolio, documented through published applications and granted patent rights across multiple jurisdictions.
- Guided system integration and experimental validation from research prototype toward industrial application.
- Technology currently being transferred and adapted through industrialization work with BEUMER Group and demonstrated in a DPD pilot project in Cologne.
- Central research platform and subject of the ongoing doctoral dissertation.

evoBOT — Dynamically Stable Two-Wheeled Mobile Manipulation Robot

- One of the core inventors and architect of the overall control system.
- Personally conceived and designed the control architecture; component implementation was performed partly by team members under technical direction and supervision.
- Guided integration of control, sensing, actuation, and manipulation functions into a functional high-dynamic robot prototype.
- Protected by granted German patent DE 10 2022 202 045 B4, following published application DE 10 2022 202 045 A1.
- Reached more than 100 million views across social-media videos, podcasts, and television coverage, as reported in the Fraunhofer IML Annual Report 2024.
- Additional technical demonstrations are documented through publicly available videos.

Large-Scale Robotics Facility and Drone Swarm

- Helped build and commission the robotics research facility at TU Dortmund University.
- Brought a Vicon motion-capture installation with more than 50 cameras into reliable operation and enabled colleagues to use it independently.
- Contributed to a coordinated experimental swarm of up to 12 drones.

DETAILED PATENT RECORD

Portfolio summary: Named inventor on all 15 patent families in the current robotics portfolio: 14 associated with LoadRunner and one with evoBOT. The portfolio covers high-dynamic autonomous transport, mobile manipulation, load handling, system control, vehicle coordination, localization, routing, and fleet operation. It is documented through 48 published patent-application documents and includes eight granted U.S. patents and approximately 50 national or regional grants across multiple jurisdictions.

DOCTORAL RESEARCH

Doctoral Researcher — TU Dortmund University

Expected submission: Late 2026

Provisional dissertation title: Integrated Control Architecture for a Highly Dynamic Transport-Robot Swarm in Logistics

- Focus on the design, control, and application of high-dynamic autonomous transport robots.
- LoadRunner serves as the central research platform.
- Documents the conception and design of the overall control architecture, including feedback control, state estimation, trajectory generation, and fleet orchestration.
- Doctoral supervisor: Prof. Dr. Dr. h. c. Michael ten Hompel.

EDUCATION

Master of Science in Electrical Engineering and Information Technology — TU Dortmund University

November 2016

Bachelor of Science in Electrical Engineering and Information Technology — TU Dortmund University

October 2013

PUBLICATIONS AND SCHOLARLY RECORD

73 Google Scholar citations | **h-index 3** | **i10-index 3**

Google Scholar profile: <https://scholar.google.com/citations?user=4w4YfloAAAAJ>

Metrics recorded August 2026. Scholarly record: 2 peer-reviewed publications and 1 additional editorial-reviewed technical report. The Google Scholar profile also includes patent records.

SELECTED RECOGNITION AND PUBLIC IMPACT

- Robotics inventions protected through 15 patent families—14 associated with LoadRunner and one with evoBOT—documented through 48 published application documents and including eight granted U.S. patents and approximately 50 territorial grants.
- LoadRunner technology progressing through industrialization work with BEUMER Group and applied in a DPD pilot project in Cologne.
- evoBOT reached more than 100 million views across social-media videos, podcasts, and television coverage, according to the Fraunhofer IML Annual Report 2024.

SELECTED PUBLIC EVIDENCE AND MEDIA

- Official Fraunhofer IML staff profile — confirms team-lead position, education, research focus, and work on LoadRunner and evoBOT: <https://www.iml.fraunhofer.de/de/abteilungen/b1/iot-eingebettete-systeme/team/patrick-klokowski.html>
- Fraunhofer IML — LoadRunner: Highly Dynamic Robotics for Logistics: <https://www.iml.fraunhofer.de/en/projects/2019/loadrunner-highly-dynamic-robotics-logistics.html>
- DPD Germany — documents the LoadRunner field test at the DPD depot in Cologne-Porz: <https://www.dpd.com/de/de/news/dpd-und-die-loadrunner-szenarien-fuer-den-einsatz-in-der-lagerlogistik-von-morgen/>
- Fraunhofer IML — documents the 2024 LoadRunner Technology Transfer Award and DPD field test: https://www.iml.fraunhofer.de/de/presse_medien/pressemitteilungen/loadrunner-tech-transfer-award.html
- BEUMER Group — joint Enterprise Lab for scalable mobile-robot platforms with Fraunhofer IML: <https://www.beumergroup.com/press/beumer-group-and-fraunhofer-institute-for-material-flow-and-logistics-impl-launch-joint-enterprise-lab-for-mobile-robotics/>
- Fraunhofer AI Robotics — identifies evoBOT as having been developed under Patrick Klokowski's leadership: <https://www.fraunhofer.de/en/research/current-research/ai-robotics.html>
- Fraunhofer IML — evoBOT: Inventors and Developers Explain the Technology: <https://www.youtube.com/watch?v=rVuhp-9AoVo>

- Official Fraunhofer IML evoBOT data sheet — identifies Patrick Klokowski as Team Leader, Control Technology:
https://www.Impl.fraunhofer.de/content/dam/impl/de/documents/OE%20130/evoBOT_datasheet_en.pdf
- Fraunhofer IML Annual Report 2024 — reports more than 100 million views for evoBOT:
<https://www.Impl.fraunhofer.de/content/dam/impl/en/press-media/annual-report/annual-report-2024.pdf>
- DOI record — IROS 2023 evoBOT paper listing Patrick Klokowski as first author:
<https://doi.org/10.1109/IROS55552.2023.10342128>

REFERENCES

Available upon request.