Alessandro Hu

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Research Interests

Cloud-Native Systems, Reinforcement Learning, Stochastic Optimization, Autonomous Robotics, Distributed Systems & Observability.

Education

Polytechnic University of Milan — Milan, Italy
M.Sc. in Mathematical Engineering (Quantum Eng. / Stat. Learning) — *Expected Start: Sept. 2026*

Polytechnic University of Milan — Milan, Italy
B.Sc. in Computer Engineering | GPA: 27.68/30 — *Expected Graduation: Sept. 2026*

- **Relevant Coursework:** Probability Theory, Distributed Systems, Software Engineering, Foundations of AI, Computer Architecture and OS, Theory of Stochastic Processes, Thermodynamics, Circuit Theory.

Research & Academic Projects

Serverless Autoscaling with Reinforcement Learning

- Formulated cloud-native serverless function autoscaling as a Markov Decision Process (MDP) to optimize resource allocation dynamically.
- Researched and trained Reinforcement Learning (RL) agents in simulated cluster environments, evaluating performance trade-offs against traditional threshold-based policies.
- Demonstrated significant latency reductions and resource cost optimization under highly dynamic, stochastic traffic workloads.

Robotics, Odometry & ROS2 Localization

- Designed and implemented state estimation, mapping, and localization pipelines for an omnidirectional robotic platform using ROS2 (C++).
- Processed asynchronous sensor telemetry and rosbag recordings, incorporating kinematic models for multi-sensor state estimation.

Systems & Open Source Engineering

Jaeger (jaegertracing/jaeger) | *Go, Observability, Distributed Tracing* — July 2026

- Contributed to storage layer robustness in the CNCF Jaeger project by fixing critical nil-pointer panics within the `storage/v2/grpc` component.

Helm (helm/helm) | *Go, Cloud-Native Infrastructure* — August 2026

- Developed fallback parsing logic for ASCII-armored bare public keys to bypass localized GPG runtime limitations in verification workflows (`--keyring`).
- Authored CDN invalidation infrastructure logic for Helm's official package repository deployment.

KubeStellar (kubestellar/kubestellar) | *Go, Kubernetes, OCM* — July 2026

- Designed and implemented ConditionRules to prevent infinite resource creation loops in multi-cluster deployments managed via Open Cluster Management (OCM) ManifestWork.

Keycloak (keycloak/keycloak) | *Java, Identity Management* — August 2026

- Resolved API SMTP validator failures by handling edge-cases of disabled EmailSenderProviders, improving user provisioning stability.

Technical Skills

Programming Languages: Go, Python, TypeScript, Java, C, C++, Swift
Systems & Infrastructure: Kubernetes, Docker, Helm, ROS2, Linux (Arch), Distributed Systems
Mathematical & AI Tools: TensorFlow/PyTorch, Reinforcement Learning, Stochastic Processes

Honors & Awards

3rd Place Overall & Best Project Award | BiblioHackDay — May 2024

- Awarded "Most Appreciated Project" (voted by 100+ participants) and placed 3rd overall for a collaborative Python game engine project.