

Riccardo Pincioli, Ph.D.

» Postdoctoral Fellow

📁 Department of Computer Science, Gran Sasso Science Institute, L'Aquila, Italy

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Academic Positions

- Oct. 2020 – Ongoing 📌 **Postdoctoral Fellow.** Dept. of Computer Science, GSSI, Italy.
Topic: Performance evaluation of cyber-physical systems (e.g., smart hospitals), uncertainty propagation, usage of GIS models to investigate virus propagation.
Supervisor: Dr. Trubiani C.
- Sep. 2019 – Sep. 2020 📌 **Postdoctoral Fellow.** Dept. of Computer Science, William and Mary, VA, USA.
Topic: Performance prediction for resource allocation in the cloud, effective serving of deep neural network applications, reliability analysis of storage devices.
Supervisor: Dr. Smirni E.
- Feb. 2019 – Sep. 2019 📌 **Research Assistant.** Dept. of Computer Science, William and Mary, VA, USA.
Topic: Performance prediction for resource allocation in the cloud, effective serving of deep neural network applications, reliability analysis of storage devices.
Supervisor: Dr. Smirni E.
- Nov. 2017 – Jan. 2019 📌 **Research Assistant.** DEIB, Politecnico di Milano, Italy.
Topic: Performance and capacity analysis of university private cloud to support the research projects.
Supervisor: Dr. Di Nitto E.

Education

- Nov. 2014 – Feb. 2018 📌 **Ph.D.** in Information Technology at Politecnico di Milano, Italy.
Dissertation: Energy efficiency in large data-centers using performance evaluation techniques
Advisors: Dr. Gribaudo M. and Dr. Serazzi G.
- Oct. 2012 – Oct. 2014 📌 **M.Sc.** in Computer Engineering at Politecnico di Milano, Italy.
Thesis: Energy consumption minimization in systems with multi-class workloads
Advisors: Dr. Gribaudo M. and Dr. Serazzi G.
Final Score: 110/110 cum laude
- Oct. 2009 – Jul. 2012 📌 **B.Sc.** in Computer Engineering at Politecnico di Milano, Italy.

Visiting Experiences

- Feb. 2018 – Jun. 2018 📌 **Visiting Scholar.** Dept. of Computer Science, William and Mary, VA, USA.
Supervisor: Dr. Smirni E.
- Jan. 2016 – Apr. 2016 📌 **Visiting Scholar.** ECE Dept., Duke University, NC, USA.
Supervisor: Dr. Trivedi K.

Research Activities

Performance and Reliability Analysis	■ Usage of stochastic modeling formalism (queuing networks, Petri nets, and Markov chains), simulation, and experimental evaluation to investigate the performance and the dependability of large-scale and high-performance computing systems, including Big Data applications, cloud computing systems, and storage devices.
Cloud Computing	■ Profiling and modeling of virtual resources for predicting and optimizing the performance of burstable instances and serverless computing in public cloud (AWS). The proposed models account for bursty workloads and allow meeting SLOs defined on the latency distribution.
Uncertainty Propagation	■ Analysis of dependability and performance models to investigate how uncertainty on input parameters propagates through a model and affects its output measures.

Keywords: Performance Evaluation; Cloud Computing; Uncertainty Propagation; Energy Consumption; Stochastic Models; Load Balancing; Queuing Networks; Petri Nets; Markov Chains; Simulation; Large-Scale Systems; Reliability; Data Analysis







Scientific Committees

2023	■ Publicity Chair. ACM SIGMETRICS 2023
	■ Organizer. Workshop on Artificial Intelligence for Performance Modeling, Prediction, and Control (AIPerf 2023)
	■ Program Committee. Technical track on Software Architecture: Theory, Technology, and Applications (SAT-TA) at SAC 2023
	■ Program Committee (Emerging Research Track). ACM/SPEC International Conference on Performance Engineering (ICPE 2023)
	■ Program Committee (Poster Track). IEEE International Conference on Software Architecture (ICSA 2023)
	■ Program Committee. Workshop on Hot Topics in Cloud Computing Performance (HotCloud-Perf 2023)
2022	■ Program Committee (Industrial Track). European Conference on Software Architecture (ECSA 2022)
	■ Program Committee (Work-in-Progress and Vision Track). ACM/SPEC International Conference on Performance Engineering (ICPE 2022)
	■ Program Committee (Artifact Evaluation Track). ACM/SPEC International Conference on Performance Engineering (ICPE 2022)
	■ Program Committee. IEEE International Conference on JointCloud Computing (JCC 2022)
	■ Program Committee (Artifact Evaluation Track). International Conference on Quantitative Evaluation of SysTems (QEST 2022)
	■ Program Committee. Workshop on Hot Topics in Cloud Computing Performance (HotCloud-Perf 2022)
	■ Program Committee. International Workshop on Energy-Efficient Data Centres (E2DC 2022)
	■ Program Committee. Workshop on Cloud, IoT and Fog Systems (CIFS 2022)

Scientific Committees (continued)


- 2021  **Program Committee.** Workshop on Software Engineering for Resilient Systems (SERENE 2022)
- 2021  **Program Committee.** IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2021)
-  **Program Committee.** IEEE International Conference on JointCloud Computing (JCC 2021)
-  **Program Committee (Cloud Computing and Data Centers Track).** IEEE International Conference on Distributed Computing Systems (ICDCS 2021)
-  **Program Committee (Artifact Evaluation Track).** ACM/SPEC International Conference on Performance Engineering (ICPE 2021)
-  **Program Committee (Artifact Evaluation Track).** International Conference on Quantitative Evaluation of SysTems (QEST 2021)
-  **Program Committee.** International Workshop on Energy-Efficient Data Centres (E2DC 2021)
- 2020  **Program Committee.** International Conference on Quantitative Evaluation of SysTems (QEST 2020)
-  **Program Committee.** IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2020)

Teaching Activities

- 2022/2023  **Simulation Theory and Applications** (for Ph.D. students), held by Dr. Pinciroli R. at Gran Sasso Science Institute
Role: Teacher
- 2020/2021 – 2021/2022  **Formal Methods at Work** (for Ph.D. students), held by Dr. Trubiani C. and Dr. Pinciroli R. at Gran Sasso Science Institute
Role: Teacher
- 2018/2019 – 2019/2020  **Impianti e Servizi Informatici** (for B.Sc. students), held by Dr. Mirandola R. at Politecnico di Milano (OnLine)
Role: Teaching assistant
- 2018/2019  **Computer Systems Performance Evaluation** (for M.Sc. students), held by Dr. Gribaudo M. at Politecnico di Milano
Role: Teaching assistant
- 2017/2018  **Computer Systems Performance Evaluation** (for M.Sc. students), held by Dr. Serazzi G. at Politecnico di Milano
Role: Teaching assistant
- 2014/2015 – 2016/2017  **Performance Evaluation of Computer Systems** (for M.Sc. students), held by Dr. Gribaudo M. at Politecnico di Milano (Como)
Role: Teaching assistant

Publications

Journal Articles

-  **Pinciroli, R., & Trubiani, C.** (2023). “Performance Analysis of Fault-Tolerant Multi-Agent Coordination Mechanisms” [Early Access]. *IEEE Transactions on Industrial Informatics*, pp. 1–12.

- J2** **Pincirolì, R.**, Yang, L., Alter, J., & Smirni, E. (2023). "Lifespan and Failures of SSDs and HDDs: Similarities, Differences, and Prediction Models". *IEEE Transactions on Dependable and Secure Computing*, 20(1), pp. 256–272.
- J3** Trubiani, C., **Pincirolì, R.**, Biaggi, A., & Fontana, F. A. (2023). "Automated Detection of Software Performance Antipatterns in Java-Based Applications" [Early Access]. *IEEE Transactions on Software Engineering*, pp. 1–19.
- J4** Antonelli, F., Cortellessa, V., Gribaudo, M., **Pincirolì, R.**, Trivedi, K., & Trubiani, C. (2020). "Analytical modeling of performance indices under epistemic uncertainty applied to cloud computing systems". *Future Generation Computer Systems*, 102, pp. 746–761.
- J5** **Pincirolì, R.**, Ali, A., Yan, F., & Smirni, E. (2020). "CEDULE+: Resource Management for Burstable Cloud Instances Using Predictive Analytics". *IEEE Transactions on Network and Service Management*, pp. 1–13.
- J6** Gribaudo, M., **Pincirolì, R.**, & Trivedi, K. (2018). "Epistemic uncertainty propagation in power models". *Electronic Notes in Theoretical Computer Science*, 337, pp. 67–86.
- J7** **Pincirolì, R.**, & Distefano, S. (2017). "Characterization and evaluation of mobile crowdsensing performance and energy indicators". *ACM SIGMETRICS Performance Evaluation Review*, 44(4), pp. 80–90.

Conference Proceedings

- C1** Ali, A., **Pincirolì, R.**, Yan, F., & Smirni, E. (2022). "Optimizing Inference Serving on Serverless Platforms", In *Proceedings of the Very Large Data Base Endowment (VLDB)*, VLDB Endowment.
- C2** Murgia, M., **Pincirolì, R.**, Trubiani, C., & Tuosto, E. (2022). "On Model-Based Performance Analysis of Collective Adaptive Systems", In *Proceedings of the International Symposium on Leveraging Applications of Formal Methods, Verification and Validation (ISoLA)*, Springer.
- C3** Schmedding, A., Yang, L., **Pincirolì, R.**, & Smirni, E. (2022). "GeoSpread: an Epidemic Spread Modeling Tool for COVID-19 Using Mobility Data", In *Proceedings of the International Conference on Information Technology for Social Good (GoodIT)*, ACM.
- C4** **Pincirolì, R.**, Smith, C. U., & Trubiani, C. (2021). "QN-based Modeling and Analysis of Software Performance Antipatterns for Cyber-Physical Systems", In *Proceedings of the International Conference on Performance Engineering (ICPE)*. ACM/SPEC.
- C5** **Pincirolì, R.**, & Trubiani, C. (2021). "Model-based Performance Analysis for Architecting Cyber-Physical Dynamic Spaces", In *Proceedings of the 18th International Conference on Software Architecture (ICSA)*. IEEE.
- C6** Ali, A., **Pincirolì, R.**, Yan, F., & Smirni, E. (2020). "Batch: machine learning inference serving on serverless platforms with adaptive batching", In *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*. IEEE.
- C7** Yang, L., Schmedding, A., **Pincirolì, R.**, & Smirni, E. (2020). "Simulating COVID-19 containment measures using the South Korean patient data: poster abstract", In *Proceedings of the 18th Conference on Embedded Networked Sensor Systems (SenSys)*. ACM.
- C8** Ali, A., **Pincirolì, R.**, Yan, F., & Smirni, E. (2019). "It's not a Sprint, it's a Marathon: Stretching Multi-resource Burstable Performance in Public Clouds", In *Proceedings of the 20th International Middleware Conference Industrial Track (Middleware)*, ACM.

- C9** Ali, A., **Pinciroli, R.**, Yan, F., & Smirni, E. (2018). “CEDULE: A Scheduling Framework for Burstable Performance in Cloud Computing”, In *Proceedings of the International Conference on Autonomic Computing (ICAC)*. IEEE.
- C10** **Pinciroli, R.**, Bobbio, A., Bolchini, C., Cerotti, D., Gribaudo, M., Miele, A., & Trivedi, K. (2017). “Epistemic uncertainty propagation in a weibull environment for a two-core system-on-chip”, In *Proceedings of the 2nd International Conference on System Reliability and Safety (ICSRS)*. IEEE.
- C11** **Pinciroli, R.**, Gribaudo, M., Roveri, M., & Serazzi, G. (2017). “Capacity Planning of Fog Computing Infrastructures for Smart Monitoring”, In *Workshop on New Frontiers in Quantitative Methods in Informatics (InfQ)*. Springer.
- C12** **Pinciroli, R.**, Gribaudo, M., & Serazzi, G. (2017). “Modeling Multiclass Task-Based Applications on Heterogeneous Distributed Environments”, In *Proceedings of the International Conference on Analytical and Stochastic Modeling Techniques and Applications (ASMTA)*. Springer.
- C13** Cerotti, D., Gribaudo, M., **Pinciroli, R.**, & Serazzi, G. (2016). “Optimal population mix in pool depletion systems with two-class workload”, In *Proceedings of the 10th International Conference on Performance Evaluation Methodologies and Tools (ValueTools)*. EAI.
- C14** Cerotti, D., Gribaudo, M., **Pinciroli, R.**, & Serazzi, G. (2016). “Stochastic Analysis of Energy Consumption in Pool Depletion Systems”, In *Proceedings of the 18th International GI/ITG Conference on Measurement, Modelling, and Evaluation of Computing Systems and Dependability and Fault Tolerance (MMB&DFT)*. Springer.
- C15** **Pinciroli, R.**, & Distefano, S. (2016). “Extending Queuing Networks to Assess Mobile CrowdSensing Application Performance”, In *Proceedings of the 10th International Conference on Performance Evaluation Methodologies and Tools (ValueTools)*. EAI.
- C16** **Pinciroli, R.**, Trivedi, K. S., & Bobbio, A. (2016). “Parametric Sensitivity and Uncertainty Propagation in Dependability Models”, In *Proceedings of the 10th International Conference on Performance Evaluation Methodologies and Tools (ValueTools)*. EAI.
- C17** Cerotti, D., Gribaudo, M., Piazzolla, P., **Pinciroli, R.**, & Serazzi, G. (2015). “Modeling Power Consumption in Multicore CPUs with Multithreading and Frequency Scaling”, In *Proceeding of the 30th International Symposium on Computer and Information Sciences (ISCIS)*, Springer.
- C18** Cerotti, D., Gribaudo, M., Piazzolla, P., **Pinciroli, R.**, & Serazzi, G. (2014). “Multi-Class Queuing Networks Models for Energy Optimization”, In *Proceedings of the 8th International Conference on Performance Evaluation Methodologies and Tools (ValueTools)*. EAI.

Books and Chapters

- B1** Cerotti, D., Gribaudo, M., **Pinciroli, R.**, & Serazzi, G. (2019). “Modeling Techniques for Pool Depletion Systems”. *Systems Modeling: Methodologies and Tools*, pp. 79–94.

L'Aquila – February 18, 2023