

# Gabriele Ara, Eng

Embedded Systems, Real-Time Systems, System Programming, Research

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Gabriele Ara is a Ph.D. Student at Scuola Superiore Sant'Anna, Pisa (Italy). He has more than 10 years of experience in system programming.

Gabriele's expertise spans multiple fields in Computer and Software Engineering and IT, including embedded systems, real-time systems, scheduling, computer architectures, software design and implementation, system programming, networking, and research.

He is currently a proud member of the Real-Time Systems Lab at Scuola Superiore Sant'Anna under the supervision of Prof. Tommaso Cucinotta, and his research interests include energy-aware scheduling of real-time systems on embedded platforms running Linux, high-performance network communications in cloud environments, and the simulation of multi-core real-time systems.

Gabriele has a B.Sc. in Computer Engineering (cum laude) from the University of Pisa, Pisa (Italy), and an M.Sc. in Embedded Computing Systems Engineering (cum laude), a course jointly offered by the University of Pisa and Scuola Superiore Sant'Anna, Pisa (Italy).

Gabriele speaks fluently Italian and English (almost) alike. His colleagues describe him as analytical, creative, competitive, and goal-oriented.

## Current Position

### Ph.D. Student

2019–Present

Scuola Superiore Sant'Anna, Pisa (Italy)

[www.santannapisa.it](http://www.santannapisa.it)

Supervisor: Prof. Tommaso Cucinotta

Research topics include Energy-Aware Scheduling of Real-Time Tasks, Dynamic Voltage and Frequency Scaling (DVFS) on Embedded Platforms, Real-Time Systems Simulation and Scheduling, and High-Performance Networking Stacks and Frameworks.

## Experience

### Textbook Author

2013–Present

Zanichelli editore S.p.A (Italy)

[www.zanichelli.it](http://www.zanichelli.it)

Gabriele writes from time to time chapters and sections of IT textbooks in Italian. The chapters focus on mobile application development essentials for Android OS, from the very basics to more advanced use-case examples.

### High School Teaching Professional

2018–2019

Istituto di Istruzione Superiore "Vespucci-Colombo", Livorno (Italy)

[vespucci.edu.it](http://vespucci.edu.it)

For one academic year, Gabriele worked as a part-time professor in an Italian high school, teaching IT and IT Laboratory to both 10th and 11th-grade students.

### E-learning Technical Specialist

2017–2018

University of Pisa, Pisa (Italy)

[www.unipi.it](http://www.unipi.it)

To support my studies, I worked a couple of years as on-site support to technical and teaching personnel for the University for practical aspects of live streaming classes and conferences and the post-production of videos of an e-learning platform. Duties included managing recording equipment, streaming software, and providing hands-on support in case of live failures.

### Tutor

2013–2018

Independent Contractor, Livorno (Italy)

Throughout my university years, I managed to help some high school students in STEM fields as their tutor, helping them with assignments in classes such as Computer Engineering, IT, Maths, Electronics, and Physics.

## Awards

### Best Paper Award

2020

Gabriele Ara, Tommaso Cucinotta, Luca Abeni, Carlo Vitucci, for the work "**Comparative Evaluation of Kernel Bypass Mechanisms for High-performance Inter-container Communications**" at the 10th International Conference on Cloud Computing and Services Science (CLOSER), 2020

## Education

### Master of Science (M.Sc.) in Embedded Computing Systems

2019

University of Pisa and Scuola Superiore Sant'Anna, Pisa (Italy)

Specialized curriculum in system programming, embedded and real-time systems, mechatronics, computer architectures and component frameworks. Final grade: *Summa cum laude*. Subject of the dissertation: *Design and Implementation of a Performance Testing Framework for High-Performance Inter-Container Communications*. Supervisor: *Prof. Tommaso Cucinotta*.

### Bachelor of Science (B.Sc.) in Computer Engineering

2016

University of Pisa, Pisa (Italy)

Specialized curriculum in computer science and engineering, computer architectures, system programming, industrial automation and control systems. Final grade: *Summa cum laude*. Subject of the dissertation (in Italian): *Dynamic and Interactive Crisis Mapping and Generation*. Supervisor: *Prof. Marco Avvenuti*.

### Secondary Diploma as IT Professional

2013

Istituto Tecnico Industriale Statale G. Galilei, Livorno (Italy)

[www.galileilivorno.gov.it](http://www.galileilivorno.gov.it)

Curriculum in computer science, programming patterns, web technologies, mobile app development, networking, and system programming. Final grade: *100/100*.

## Supervision

### Leonardo Lai

2019

Master student in Embedded Computing Systems

Scuola Superiore Sant'Anna, Pisa (Italy)

Subject of the dissertation: *Implementation and Evaluation of High-Performance Userspace Networking Mechanisms for Virtualized Network Functions*

## Professional Skills

**Communication skills** Comfortable interacting with people with cross-cultural backgrounds from around the world. Gave presentations to moderate international audiences for conferences and workshops. Can communicate strengths and weaknesses of his work.

**Organisational/Managerial skills** Can both work in small teams and manage to get things done by himself. Comfortable leading other people when necessary to organize the work. Excellent debugging and investigative skills for software/computer systems.

## Job-related skills

Following is the list of known programming languages and tools organized by proficiency level.

### Excellent knowledge and proficiency:

- **C/C++**, including the understanding of language internals, standard libraries, POSIX, Linux-specific libraries, Linux system programming, microcontrollers programming.

### Proficient knowledge:

- **Virtualization** technologies, including Docker, LXC, LXD, and custom solutions based on *cgroups* and *namespaces*;
- **High-Performance Networking** frameworks, including DPDK, FD.io VPP, Open vSwitch;
- **Linux** management and administrative tools for machine configuration and troubleshooting.
- **Unix**-based systems command line, scripting in **Sh** and **Bash**;
- **Java** (standard libraries, JavaFX, Spring, Apache and Servlet libraries);
- **Android** App programming (using Java+XML);

## Good knowledge:

- **Linux kernel** internals and hacking;
- **JavaScript** (standard libraries, JQuery, D3);
- **Matlab** and Simulink for scripting, data analysis, and system control or simulation;
- **Web** development using HTML5, PHP5, CSS3, XML, JSON, REST patterns;
- **SQL** and MySQL software suite;
- **CISCO** technologies and CISCO IOS;

## Languages

Mother tongue  
Other languages<sup>1</sup>

**Italian**

**English<sup>2</sup>**

Understanding				Speaking				Writing	
Listening		Reading		Interaction		Production			
C2	Fluent	C2	Fluent	C2	Fluent	C1	Fluent	C2	Fluent

<sup>1</sup> Common European Framework of Reference for Languages (CEFR)

<sup>2</sup> 2012 – Trinity's Graded Examinations in Spoken English - Grade 7 (CEFR B2)

## Personal Interests

Science, Technology, Traveling, Playing and Listening to Music, Food, Movies, Trekking

## Publications

### Peer-reviewed Journals

- [1] ReTiF: A declarative real-time scheduling framework for POSIX systems  
Gabriele Serra, Gabriele Ara, Pietro Fara, Tommaso Cucinotta  
*Journal of Systems Architecture* 118 (2021), p. 102210  
doi: 10.1016/j.sysarc.2021.102210
- [2] A Framework for Comparative Evaluation of High-Performance Virtualized Networking Mechanisms  
Gabriele Ara, Leonardo Lai, Tommaso Cucinotta, Luca Abeni, Carlo Vitucci  
*Cloud Computing and Services Science*, 2021, Springer International Publishing  
doi: 10.1007/987-3-030-72369-9\_3

### Peer-reviewed Conference and Workshop Proceedings

- [1] Ultra-low Latency NFV Services Using DPDK  
Leonardo Lai, Gabriele Ara, Tommaso Cucinotta, Koteswararao Kondepudi, Luca Valcarenghi  
*Proceedings of the 7th IEEE Conference on Network Function Virtualization and Software Defined Networks (IEEE NFV-SDN)*, 2021, IEEE
- [2] An Architecture for Declarative Real-Time Scheduling on Linux  
Gabriele Serra, Gabriele Ara, Pietro Fara, Tommaso Cucinotta  
*2020 IEEE 23rd International Symposium on Real-Time Distributed Computing (ISORC)*, 2020  
doi: 10.1109/ISORC49007.2020.00013
- [3] Comparative Evaluation of Kernel Bypass Mechanisms for High-performance Inter-container Communications  
Gabriele Ara, Tommaso Cucinotta, Luca Abeni, Carlo Vitucci  
*Proceedings of the 10th International Conference on Cloud Computing and Services Science - Volume 1: CLOSER*, 2020, SciTePress  
doi: 10.5220/0009321200440055
- [4] On the Use of Kernel Bypass Mechanisms for High-Performance Inter-container Communications  
Gabriele Ara, Luca Abeni, Tommaso Cucinotta, Carlo Vitucci  
*High Performance Computing*, 2019, Springer International Publishing  
doi: 10.1007/978-3-030-34356-9\_1

## Book Chapters

- [1] Gabriele Ara,  
Programmazione di App per Dispositivi con Sistema Operativo Android, Italian,  
In: ***Manuale Cremonese di Informatica e Telecomunicazioni***,  
A cura di A. Liberatore et al.,  
3rd Edition,  
Zanichelli Editore (Italy), apr. 2020,  
Cap. 33, pp. 1433–1486,  
ISBN: 9788808920300.
- [2] Gabriele Ara,  
Programmazione di Applicazioni per Dispositivi Mobili, Italian,  
In: ***Tecnologie e progettazione di Sistemi Informatici e di Telecomunicazioni***,  
A cura di Giorgio Meini e Fiorenzo Formichi,  
2nd Edition, vol. 3.B,  
Zanichelli Editore (Italy), apr. 2015,  
Pp. 243–333,  
ISBN: 9788808878809.
- [3] Gabriele Ara,  
Programmazione di App per Dispositivi con Sistema Operativo Android, Italian,  
In: ***Manuale Cremonese di Informatica e Telecomunicazioni***,  
A cura di A. Liberatore et al.,  
2nd Edition,  
Zanichelli Editore (Italy), apr. 2015,  
Cap. 35, pp. 1479–1509,  
ISBN: 9788808151698.
- [4] Gabriele Ara,  
Programmazione di Applicazioni per Dispositivi Mobili, Italian,  
In: ***Tecnologie e progettazione di Sistemi Informatici e di Telecomunicazioni***,  
A cura di Giorgio Meini e Fiorenzo Formichi,  
1st Edition, vol. 3.B,  
Zanichelli Editore (Italy), apr. 2014,  
Pp. 295–387,  
ISBN: 9788808735010.

## Presentations

- [1] On the Use of Kernel Bypass Mechanisms for High-Performance Inter-container Communications  
Frankfurt, Germany, June 20, 2019
- [2] Comparative Evaluation of Kernel Bypass Mechanisms for High-performance Inter-container Communications  
[Online on YouTube] Prague, Czech Republic, May 7, 2020