Gabriele **Ara**, Eng

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

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Livorno, Italy

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
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
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
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
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
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 **Italian**

Other languages[1]

	Understanding		Speaking		Writing
	Listening	Reading	Interaction	Production	
English[2]	C2 Fluent	C2 Fluent	C2 Fluent	C1 Fluent	C2 Fluent

[1] *Common European Framework of Reference for Languages (CEFR)*

[2] *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 Kondepu, 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