

# Juri Lelli

SENIOR SOFTWARE ENGINEER · KERNEL HACKER

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## Summary

Working on operating system support for next-generation ARM technology in the **OS power management** team at ARM: **Linux kernel** support for big.LITTLE, including **kernel scheduler** support and existing Linux power management frameworks. **Maintainer** of the **SCHED\_DEADLINE Linux scheduling class**. Well known in the Linux kernel development community with 5+ years of experience.

## Work Experience

### ARM Ltd.

SENIOR SOFTWARE ENGINEER

Cambridge, UK

Jul. 2014 - PRESENT

- Operating system support for big.LITTLE and next-generation ARM technology.
- **Linux kernel** support and development for **scheduler and power management** frameworks.
- **Maintainer** of the **SCHED\_DEADLINE Linux scheduling class**.
- Workload **power and performance analysis** (kernel level) on **Linux/Android**.
- Collaborated with the **Google Android kernel team** for the release of the **Pixel Android phone**.

### Contributions within the EU Research Project “Java Platform for High-Performance and Real-Time Large Scale Data”

Pisa, IT

RESEARCHER

Jan. 2013 - Jul. 2014

- JUNIPER - FP7-ICT-2011.4.4 - Grant Agreement No. 318763 - <http://www.juniper-project.org/>
- Development and maintenance of the SCHED\_DEADLINE scheduler for the Linux kernel.
- Implementation of the Multiprocessor Bandwidth Inheritance real-time synchronization protocol in Linux.

### Contributions to the EU Research Project “Service Oriented Operating Systems”

Pisa, IT

RESEARCHER

Feb. 2011 - Jul. 2012

- SoOS - FP7-ICT-2009.8.1 - Grant Agreement No. 248465 - <http://www.soos-project.eu/>
- Contributions to deliverables: D3.4 “Protocols”, D4.4 “Execution Management”, D7.3.2 “Collaboration and Dissemination II”.
- Demo for 2<sup>nd</sup> year project review.

### Retis Lab (Scuola Superiore Sant’Anna of Pisa)

Pisa, IT

RESEARCHER

Jan. 2011 - Apr. 2011

- **Linux kernel** developer.

### Library of Veterinary Medicine (University of Pisa)

Pisa, IT

LIBRARIAN

Jun. 2009 - Nov. 2009

- Loan officer.

### Faculty of Engineering (University of Pisa)

Pisa, IT

TUTOR

Feb. 2009 - May 2009

- Tutor of 1st year students.

### Faculty of Engineering (University of Pisa)

Pisa, IT

LINUX/WINDOWS OPERATING SYSTEMS ANALYST/ADMINISTRATOR

Apr. 2007 - Jul. 2007

- Software/Hardware maintenance, systems configuration.

### Admissions Office (University of Pisa)

Pisa, IT

ADMINISTRATIVE STAFF ASSISTANT

Nov. 2005 - Feb. 2006

- Filing clerk, students tutor.

## Events & Talks

### RT-Linux mini summit 2011

Prague, Czech Republic

ATTENDED

Oct. 2011

- Participated to the discussions.

### 7<sup>th</sup> Workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPRT11)

Porto, Portugal

PRESENTER

Jul. 2011

- Presented “An efficient and scalable implementation of global EDF in Linux”.

## 8<sup>th</sup> Workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPRT12)

*Pisa, Italy*

PRESENTER

*Jul. 2012*

- Presented "PRACTISE: a framework for PeRformance Analysis and Testing of real-time multicore SchEdulers for the Linux kernel".

## Linux Plumbers Conference 2012

*San Diego (CA), USA*

PRESENTER

*Sep. 2012*

- Attended and presented at the scheduling micro-conf.

## Embedded Linux Conference 2013

*San Francisco (CA), USA*

ATTENDED

*Feb. 2013*

- Participated to talks and discussions.

## Linux Kernel Summit 2013

*Edinburgh, UK*

ATTENDED

*Oct. 2013*

- Participated to the discussions.

## 15<sup>th</sup> Real Time Linux Workshop (RTLWS15)

*Lugano, Switzerland*

PRESENTER

*Oct. 2013*

- Presented "Design and Implementation of the Multiprocessor Bandwidth Inheritance Protocol on Linux".

## 4<sup>th</sup> Annual International Conference on Energy Aware Computing Systems & Applications (ICEAC13)

*Istanbul, Turkey*

PRESENTER

*Dec. 2013*

- Presented "On the Energy-Aware Partitioning of Real-Time Tasks on Homogeneous Multi-Processor Systems".

## Linux Plumbers Conference 2014

*Düsseldorf, Germany*

ATTENDED

*Oct. 2014*

- Attended and participated to RT, scheduling and power management micro-confs.

## Linux Plumbers Conference 2015

*Seattle, USA*

PRESENTER

*Aug. 2015*

- Participated to scheduling and power management mirco-confs.
- Presented scheduler driven CPU frequency scaling solution.

## Linaro Connect 2015 (SF015)

*San Francisco, USA*

ATTENDED

*Sep. 2015*

- Participated to scheduling and power management discussions and hacking sessions.
- Discussed the scheduler driven CPU frequency scaling solution and the Energy Aware Scheduling implementation.
- Participated to partners meetings.

## Embedded Linux Conference 2015

*San Diego, USA*

PRESENTER

*Apr. 2015*

- Presented "SCHED\_DEADLINE: a status update": Slides (<https://goo.gl/OVspul>).

## Linaro Connect 2016 (BKK16)

*Bangkok, Thailand*

ATTENDED

*Mar. 2016*

- Participated to scheduling and power management discussions and hacking sessions.
- Discussed the Energy Aware Scheduling implementation.
- Participated to partners meetings.

## Linaro Connect 2016 (LAS16)

*Las Vegas, USA*

PRESENTER

*Sep. 2016*

- Participated to scheduling and power management discussions and hacking sessions.
- Presented "Walkthrough of the EAS kernel adaptation to the Android Common Kernel": Slides/Video (<https://goo.gl/FXCdAX>).
- Participated to partners meetings.

## Linux Plumbers Conference 2016

*Santa Fe, USA*

PRESENTER

*Nov. 2016*

- Participated to scheduling, power management and Android mirco-confs.
- Joint presentation with Google Android kernel team about work done to land the Energy Aware Scheduling solution on the Android Common Kernel.

## Education

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## Scuola Superiore Sant'Anna

PHD IN COMPUTER ENGINEERING (INNOVATIVE TECHNOLOGIES, EMBEDDED SYSTEMS)

Pisa, Italy

Nov. 2010 - Sep. 2014

- **Quality of Service** control for soft real-time systems.
- Analysis, design and development of **multiprocessor real-time scheduling and synchronization** solutions.
- Design and development of **embedded and real-time systems**.
- Linux kernel **SCHED\_DEADLINE patchset maintainer** (real-time deadline scheduling) - merged in mainline since Linux 3.14.

## University of California at Santa Cruz - Sytems Research Group

RESEARCH SCHOLAR

Santa Cruz (CA), USA

Sep. 2012 - Mar. 2013

- Design and development of **real-time scheduling mechanisms** for the **Linux kernel**.

## University of Pisa - Faculty of Computer Engineering

MASTER'S DEGREE IN COMPUTER ENGINEERING

Pisa, Italy

Mar. 2007 - Jun. 2010

- Thesis: "Design and Development of Deadline Based Scheduling Mechanisms for Multiprocessor Systems".

## University of Pisa - Faculty of Computer Engineering

BACHELOR'S DEGREE IN COMPUTER ENGINEERING

Pisa, Italy

Sep. 2002 - Jun. 2006

- Thesis: "Concurrent C++ code generation from UML statecharts".

## "G. Marconi" High School

SCIENTIFIC HIGH SCHOOL DEGREE

Grosseto, Italy

Sep. 1997 - Jul. 2002

- General scientific preparation.

# Publications

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## JOURNALS

### An experimental comparison of different real-time schedulers on multicore systems

Juri Lelli, Dario Faggioli, Tommaso Cucinotta, Giuseppe Lipari

*Journal of Systems and Software* 85.10 (2012) pp. 2405–2416. 2012

### Deadline scheduling in the Linux kernel

Juri Lelli, Claudio Scordino, Luca Abeni, Dario Faggioli

*Software: Practice and Experience* 46.6 (2016) pp. 821–839. 2016

## PEER-REVIEWED CONFERENCES & WORKSHOPS

### An efficient and scalable implementation of global EDF in Linux

Juri Lelli, Giuseppe Lipari, Dario Faggioli, Tommaso Cucinotta

*Proceedings of the 7<sup>th</sup> International Workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPERT 2011)*, 2011, Porto, Portugal

### PRACTISE: a framework for PeRformance Analysis and Testing of real-time multicore SchEdulers for the Linux kernel

Fabio Falzoi, Juri Lelli, Giuseppe Lipari

*Proceedings of the 8<sup>th</sup> International Workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPERT 2012)*, 2012, Pisa, Italy

### Design and Implementation of the Multiprocessor Bandwidth Inheritance Protocol on Linux

Andrea Parri, Juri Lelli, Mauro Marinoni, Giuseppe Lipari

*Proceedings of the 15<sup>th</sup> Real Time Linux Workshop (RTLWS15)*, 2013, Lugano, Switzerland

### On the Energy-Aware Partitioning of Real-Time Tasks on Homogeneous Multi-Processor Systems

Mario Bambagini, Juri Lelli, Buttazzo Giorgio, Giuseppe Lipari

*Proceedings of the 4<sup>th</sup> Annual International Conference on Energy Aware Computing Systems & Applications (ICEAC13)*, 2013, Istanbul, Turkey

### Towards Energy-aware Multiprocessor Hierarchical Scheduling of Real-time Systems

K. N. Moghaddami, Juri Lelli, Giuseppe Lipari, Thomas Nolte

*Proceedings of the 19<sup>th</sup> IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA13 WiP)*, 2013, Taipei, Taiwan

### A Linux-based Virtualized Solution Providing Quality of Service to SDN-NFV Telecommunication Applications

Carlo Vitucci, Juri Lelli, Mauro Marinoni, Andrea Parri

*Proceedings of the 16<sup>th</sup> Real Time Linux Workshop (RTLWS16)*, 2014, Düsseldorf, Germany

### A Tool for Measuring Supply Functions of Execution Platforms

Martina Maggio, Juri Lelli, Enrico Bini

*Proceedings of the 22<sup>nd</sup> IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA16 Best Paper Award)*, 2016, Daegu, South Korea

# Skills

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<b>Programming</b>	Python, Node.JS, C/C++, Scala, JAVA, OCaml, LaTeX
<b>Web</b>	Django, Express, Redux, React, HTML5, LESS, SASS
<b>Languages</b>	Korean, English, Japanese, Chinese