

Annual Research Report 2020

Department of Computer Science, University of Pisa

October 2021

Preface

This report summarizes the main research activities and achievements at the Computer Science Department of the University of Pisa in 2020. Specifically, after a short introduction to the Department, we list: *(i)* the funded projects active in 2020 that were managed by the Department; *(ii)* the editorships of journals or special issues pursued by members of the Department; *(iii)* the scientific events involving members of the Department in 2020; *(iv)* the new research positions that have been opened in 2020 with their specific themes; *(v)* the description of the two PhD schools managed by the Department; *(vi)* the visiting fellows that were welcome in 2020; and finally *(vii)* the complete list of publications having members of the Department as co-authors in the same year.

All of this testifies the relevant activity and the extensive scientific results that were achieved by the community of researchers of the Computer Science Department in 2020. As shown in this report, such a community has been enhanced in the considered year via the opening of several young researcher and PhD student positions, as well as of new faculty positions. Together with the exchange opportunities of the visiting fellows, although limited in 2020 due to the Covid-19 pandemic disease, this emphasizes the great attention of the Department towards research activities and their enhancements, as well as its wide network of scientific collaborations.

1 The Department

During the academic year 1969/1970, the University of Pisa activated a graduation program in Computer Science, i.e., the *Corso di Laurea in Scienze dell'Informazione*, the first one in Italy and one of the very first ones in Europe. Simultaneously, the Computer Science Institute ISI (*Istituto di Scienze dell'Informazione* in Italian) of the University of Pisa was founded, collecting the designers of the Calcolatrice Elettronica Pisana (CEP) together with several researchers coming from other universities, mostly with engineering and mathematics background, all characterized by a great interest and passion towards the Computer Science themes and challenges. This Institute is the ancestor of the current Computer Science Department.

Starting from the scientific results achieved in those pioneering years, the research activities of the Computer Science Department have been continuously enhanced and evolved, spanning now across all the sectors of the Computer Science discipline (INF/01) as well as to areas of applied mathematics. Specifically, since 2012 all faculties of the University of Pisa in the area of Operations Research (MAT/09) are now with the Computer Science Department, as well as about a half of the researchers in Numerical Analysis (MAT/08).

Within the above mentioned scientific sectors, at the beginning of 2020 the composition of the Department was as follows:

- 23 Full Professors (19 INF/01, 1 MAT/08 and 3 MAT/09)
- 22 Associate Professors (17 INF/01, 2 MAT/08 and 3 MAT/09)
- 4 Assistant Professors (4 INF/01) (RTI)
- 11 Temporary Assistant Professors (RTD) (10 INF/01 and 1 MAT/09)

On the other hand, at the end of 2020 the Department was composed of:

- 20 Full Professors (16 INF/01, 1 MAT/08 and 3 MAT/09)
- 23 Associate Professors (18 INF/01, 2 MAT/08 and 3 MAT/09)
- 4 Assistant Professors (4 INF/01) (RTI)
- 12 Temporary Assistant Professors (RTD) (11 INF/01 and 1 MAT/09)

In particular, four INF/01 Full Professors retired in November 2020, and there were new entries as Temporary Assistant Professors as well as upgrades to Associate and Full Professors. Another INF/01 Associate Professor coming from abroad was appointed in 2020, but the starting date of his position was postponed to 2021.

2 Research projects in 2020

The researchers of the Department have been involved in several projects, both at international, national and regional level. We report here the list of the projects funded after an open competitive call, with funds that have been managed by the Department, and that were active in 2020. We classify them according to their typology of funding. More information can be found at the url:

<https://ricerca.di.unipi.it/progetti-di-ricerca/>.

We also list projects funded by private companies, hence without an open call, but rather a direct contract with a Principal Investigator (PI) affiliated with the Department. Data of this section are taken from the research office of the Department, integrated with information from PIs when needed.

In all of the tables below, the BUDGET column indicates the fraction of the total budget of the project (that is, for the whole duration, not just during year 2020) that has been assigned to our Department.

2.1 International projects

NAME	PI UNIPI	CALL	ROLE UNIPI	DURATION	BUDGET
PLAN4RES	Frangioni	UE - H2020	third part	09/17 - 04/21	€ 324.394,00
HELIOS	Guidi - Ricci	UE - H2020	partner	01/19 - 01/21	€ 411.903,75
Humane AI	Pedreschi	UE - H2020	partner	03/19 - 04/20	€ 13.500,00
XAI	Pedreschi	UE - ERC	partner	10/19 - 09/24	€ 1.022.000,00
HumMingBird	Sirbu	UE - H2020	partner	12/19 - 12/23	€ 125.562,50
TEACHING	Bacciu	UE - H2020	coordinator	01/20 - 12/22	€ 635.960,00
NoBIAS	Ruggieri - Turini	UE - H2020	partner	01/20 - 12/23	€ 522.999,36
SoBigData++	Pedreschi	UE - H2020	partner	01/20 - 12/24	€ 580.735,00
Humane AI-NET	Pedreschi	UE - H2020	partner	09/20 - 08/23	€ 140.000,00
TAILOR	Attardi-Bacciu	UE - H2020	partner	09/20 - 08/23	€ 103.437,50
LISCIO	Brogi	UE - H2020	invoiced entity	11/20 - 03/21	€ 54.947,92
PLANET4	Mazzei	ERASMUS++	coordinator	11/20 - 10/21	€ 199.594,00

2.2 National projects

CALL	PI UNIPI	DURATION	BUDGET
SIR	Rosone	09/15 - 11/20	€ 440.310,00
PRIN	Bonchi	08/19 - 02/23	€ 159.600,00
PRIN	Ferragina	08/19 - 02/23	€ 93.127,00
PRIN	Gadducci	08/19 - 02/23	€ 128.000,00
PRIN	Grossi	08/19 - 02/23	€ 77.385,00
PRIN	Venturini	08/19 - 02/23	€ 136.305,00

2.3 Regional projects

NAME	PI UNIPI	CALL	DURATION	BUDGET
BRAID	Micheli	RICERCA-SALUTE 2018	09/20 - 09/23	€ 158.566,31

2.4 University projects

COORDINATOR	CALL	DURATION	BUDGET
Ferragina	bilateral UNIPI-MIT	up to 8/20	€ 7.000,00
Danelutto	PRA 2018	up to 12/20	€ 56.600,00
Pedreschi	PRA 2018	up to 12/20	€ 62.900,00
Pisanti	PRA 2020	up to 08/22	€ 59.855,61
Poloni	PRA 2020	up to 08/22	€ 56.925,00
Bacciu	BIHO 2019	up to 08/22	€ 75.000,00
Brogi	BIHO 2020	up to 12/21	€ 50.000,00
Monreale	BIHO 2020	up to 12/21	€ 50.000,00

2.5 Industrial projects

PI UNIPI	INDUSTRY PARTNER	DURATION	BUDGET
Mazzei	SAILADV SR Group Ltd	09/2018 - 06/2020	€ 7.200,00
Frangioni	PGMO	10/2018 - 10/2020	€ 70.000,00
Bacciu	Biobeats Group Ltd	11/2018 - 06/2021	€ 50.000,00
Frangioni	MAIOR	12/2018 - 12/2021	€ 60.000,00
Micheli	TAGES	09/2019 - 01/2020	€ 10.000,00
Ferragina	Sadas srl	12/2019 - 06/2021	€ 47.520,00
Ruggieri	Sadas srl	01/2020 - 06/2021	€ 24.000,00
Scutellà	Softec srl	02/2020 - 04/2020	€ 5.000,00
Ferragina	European Broadcasting Union	02/2020 - 07/2023	€ 180.000,00
Cisternino	Consorzio 1 Toscana Nord	04/2020 - 04/2021	€ 3.333,33
Cisternino	Consorzio 4 Basso Valdarno	04/2020 - 04/2021	€ 3.333,33
Cisternino	Consorzio di bonifica N. 5 Toscana costa	04/2020 - 04/2021	€ 3.333,33
Scutellà	Softec srl	05/2020 - 06/2020	€ 2.500,33
Priami	GSK Vaccines S.r.l.	09/2020 - 04/2021	€ 176.226,00
Frangioni	MAIOR	09/2020 - 08/2021	€ 7.020,00
Frangioni	PGMO	10/2020 - 10/2022	€ 50.000,00

3 Editorships of journals

We list here the editorial boards and the special issues of journals that involved members of the Department in 2020. This section is edited with data collected via a direct communication with the researchers.

3.1 Editorial Boards

In 2020, the members of the Department joined the editorial board, or were an area editor or an associated editor, of the following journals.

Bacciu Associate Editor of *IEEE Transactions on Neural Networks and Learning Systems* by IEEE (since 2018)

Electronic ISSN: 2162-2388, Print ISSN: 2162-237X,

<https://cis.ieee.org/publications/t-neural-networks-and-learning-systems>

Bacciu Academic Editor of *PLOS ONE* by Plos (since 2019)

ISSN 1932-6203

<https://journals.plos.org/plosone/>

Bonuccelli Area Editor of *Mobile Networks and Applications* by Springer (since 1996)

Electronic ISSN 1572-8153,

<https://www.springer.com/journal/11036>

Brogi Associate Editor of *IEEE Transactions on Cloud Computing* by IEEE (since 2019)

Electronic ISSN: 2168-7161,

<https://www.computer.org/csdl/journal/cc>

Brogi Editorial Board Member of *Journal of Computer Languages* by Elsevier (since 2019)

ISSN: 2590-1184,

<https://www.journals.elsevier.com/journal-of-computer-languages>

Brogi Editorial Board Member of *Electronics* by MDPI (since 2020)

ISSN: 2079-9292,

<https://www.mdpi.com/journal/electronics>

Chessa Associate Editor of *Journal of Ambient Intelligence and Smart Environments* by IOS Press (since 2014)

ISSN 1876-1364,

<https://www.iospress.com/catalog/journals/journal-of-ambient-intelligence-and-smart-environments>

Degano Associate editor of *Theoretical Computer Science* by Elsevier (since 2010)

ISSN: 0304-3975,

<https://www.journals.elsevier.com/theoretical-computer-science>

Degano Associate editor of *Mondo Digitale* by AICA (since 2002)

ISSN: 1720-898X,

<http://mondodigitale.aicanet.net/ultimo/index.xml>

Degano Advisory Board Member of *Monographs in Theoretical Computer Science and Texts in Theoretical Computer Science* by Springer (since 2012)

ISSN: 1431-2654,

<https://www.springer.com/series/776>

- Frangioni** Area "Design and Analysis of Algorithms - Continuous" Editor of *Journal on Computing* by INFORMS (since 2019)
ISSN: 1091-9856,
<https://pubsonline.informs.org/journal/ijoc>
- Frangioni** Area Editor of *J4OR - A Quarterly Journal of Operations Research* by Springer (since 2015)
ISSN: 1619-4500,
<http://www.4or.be>
- Frangioni** Associate Editor of *Open Journal of Mathematical Optimization* by Centre Mersenne (since 2019)
ISSN: 2777-5860
<https://ojmo.centre-mersenne.org>
- Gemignani** Editorial Board Member of *Mathematics* by MDPI (since 2020)
ISSN: 2227-7390,
<https://www.mdpi.com/journal/mathematics>
- Guidi** Academic Editor of *PLOS ONE* by Plos (since 2020)
ISSN:1932-6203,
<https://journals.plos.org/plosone/>
- Guidi** Associate Editor of *Communications* by SciencePG (since 2020)
ISSN:2328-5923,
<http://www.sciencepublishinggroup.com/journal/index?journalid=139>
- Micheli** Associate editor of *Transactions on Neural Networks and Learning Systems* by IEEE (since 2019)
ISSN: 2162-237X,
<https://cis.ieee.org/publications/t-neural-networks-and-learning-systems>
- Micheli** Academic Editor of *PLOS ONE* by Plos (from 2018 until September 2020)
ISSN: 1932-6203,
<https://journals.plos.org/plosone/>
- Micheli** Editorial Board Member of *Intelligenza Artificiale* by IOS Press (since 2015)
ISSN 1724-8035
ISSN print 1724-8035,
<http://www.iospress.nl/journal/intelligenza-artificiale/>
- Paganelli** Associate Editor of *IEEE Transactions on Network and Service Management* by IEEE (since 2019)
ISSN: 1932-4537,
<https://www.comsoc.org/publications/journals/ieee-tnsm>
- Paganelli** Associate Editor of *Future Internet* by MDPI (since 2016)
ISSN: 1999-5903,
<https://www.mdpi.com/journal/futureinternet>
- Paganelli** Associate Editor of *Telecom* by MDPI (since 2020)
ISSN: 2673-4001,
<https://www.mdpi.com/journal/telecom>

Pisanti Editorial Board Member of *International Journal of Computer Science and Application* by Science and Engineering Publishing Company USA (since 2012)

ISSN: 2324-7134,

<https://www.destechpub.com/product/ijcsa/>

Pisanti Associate Editor of *Network Modeling Analysis in Health Informatics and Bioinformatics* by Springer (since 2017)

ISSN: 21926662, Online: 21926670,

<https://www.springer.com/journal/13721>

Poloni Handling Board of *Linear and Multilinear Algebra* by Taylor & Francis (since 2020)

Print ISSN: 0308-1087 Online ISSN: 1563-5139,

<https://www.tandfonline.com/action/journalInformation?journalCode=glma20>

Prencipe Editorial Board Member of *Electronics* by MDPI, Section Board for Computer Science & Engineering (since 2019)

ISSN: 2079-9292,

https://www.mdpi.com/journal/electronics/sectioneditors/computer_science_engineering

Ricci Associate Editor of *Blockchain: Research and Applications* by Elsevier (since 2020)

ISSN 2096-7209,

<https://www.journals.elsevier.com/blockchain-research-and-applications>

Scutellà Associate Editor of *Networks* by Wiley (since 2013)

Online ISSN:1097-0037,

<https://onlinelibrary.wiley.com/journal/10970037>

Scutellà Editorial Advisory Board Member of *Computers & Operations Research* by Elsevier (since 2004)

ISSN: 0305-0548,

<http://www.journals.elsevier.com/computers-and-operations-research/>

Soldani Associate Editor of *ACM SIGSOFT Software Engineering Notes* by ACM (since 2019)

ISSN: 0163-5948,

<https://www.sigsoft.org/SEN/>

Soldani Academic Editor of *PLOS ONE* by Plos (since 2019)

ISSN: 1932-6203,

<https://journals.plos.org/plosone/>

Soldani Editorial Board Member of *Mathematics and Computer Science* by SciencePG (since 2020)

ISSN: 2575-6028,

<http://www.sciencepublishinggroup.com/j/mcs>

3.2 Guest editorship of special issues

The members of the Department managed as guest editors the following special issues, whose call had a deadline in 2020 or in the very first months of 2021, and/or were published in 2020.

This section is edited with data collected via a direct communication with the researchers.

Grossi Special Issue of *Theory of Computing Systems* by Springer dedicated to selected papers of IWOCA 2019, published in 2020.

ISSN 1432-4350, Online: 1433-0490,

https://link.springer.com/journal/224/topicalCollection/AC_0a7b27e812a570f90395125a465f44c7

- Guidi** Special issue on "Mobile Networks and Sustainable Applications" of *Sustainability* by MDPI, opened in 2020 and closing in 2021.
ISSN:2071-1050,
https://www.mdpi.com/journal/sustainability/special_issues/Mobile_Networks_Sustainable_Applications
- Micheli** Special issue of Transactions on Neural Networks and Learning Systems, IEEE, "New Frontiers in Extremely Efficient Reservoir Computing" opened in 2021 and closing in 2021.
ISSN:2162-237X
https://cis.ieee.org/images/files/Documents/call-for-papers/tnnls/CFP_Special_Issue_RC_TNNLS.pdf
- Micheli** Special issue of *Cognitive Computation* by Springer, on "Trends in Reservoir Computing" dedicated to selected papers of the "The 1st International Workshop on Reservoir Computing, RC 2019, published in 2020.
ISSN: 18669956,
- Pisanti** Special Issue of *Theory of Computing Systems* by Springer dedicated to selected papers of IWOCA 2019, published in 2020.
ISSN: 14324350,
https://link.springer.com/journal/224/topicalCollection/AC_0a7b27e812a570f90395125a465f44c7
- Pisanti** Special Issue of *Algorithms for Bioinformatics* by BMC dedicated to selected papers of WABI 2020, opened in 2020 and published in 2021.
ISSN: 14712105,
<https://www.biomedcentral.com/collections/wabi2020>
- Ricci** Special Issue of *Blockchain: Research and Applications* by Elsevier dedicated to "Blockchain: Protocols, Data Analysis, and Applications" and of extended papers of BRAIN 2020.
ISSN: 2096-7209,
- Soldani** Special issue of *Science of Computer Programming* by Elsevier, "Foundations of Coordination Languages and Self-Adaptive Systems", selected papers from FOCLASA 2018, published in 2020.
ISSN: 0167-6423,
<https://www.sciencedirect.com/science/article/pii/S0167642320300289>
- Torquati** Special Issue of *IEEE Transactions on Emerging Topics in Computing* on "New Trends in Parallel and Distributed Computing for Human Sensible Applications"
ISSN: 2168-6750,
<https://www.computer.org/digital-library/journals/ec/call-for-papers-ieee-transactions-on-emerging-topics-in-computing-special-section-on-new-trends-in-parallel-and-distributed-computing-for-human-sensible-applications>

4 Scientific events

Here we report the list of the scientific events, such as conferences and workshops, that took place in 2020 and involved members of the Department in their scientific and/or technical organization. The events are classified according to the role of the involved researchers. This section is based on data taken from the url:

<https://ricerca.di.unipi.it/workshops-and-conferences/>

combined with data obtained via personal communications with the researchers.

4.1 Chairing of conferences

Chairing or co-chairing of international conferences in Computer Science settings:

Brogi: ESOC 2020

Guidotti: XKDD 2020

Pisanti: WABI 2020

Ruggieri: FAT* 2020

Ruggieri: XAI.it 2020

Soldani: PhD Symposium, ESOC 2020

4.2 Program Committee membership of conferences

Program Committee (PC) membership of the following international conferences in Computer Science and Operations Research settings:

Bacciu: ECAI 2020, ESANN 2020, IEEE WCCI 2020

Bernasconi: DATE 2020, ICCD 2020

Bigi, Passacantando: ICORES 2020

Bodei: COORDINATION 2020, ICISSP 2020, ICE 2020, Microservices 2020

Bonchi: POPL 2020, CONCUR 2020, TTCS 2020

Brogi: ADAPTIVE 2020, ASYDE 2020, CCGrid 2020, CIBSE 2020, CloudAM 2020, ESOC 2020, ICFC 2020, ICFEC 2020, ICSOC 2020, IC2E 2020, MODELWARD 2020, SERVICE COMPUTATION 2020, SPECTS 2020, SummerSoc 2020, UCC 2020

Bruni: COORDINATION 2020, WRLA 2020

Chessa: IEEE ISCC 2020, IEEE WCNC 2020, IPIN 2020

Conte: COMPLEX NETWORKS 2020, SAC 2020, WEPA 2020

Degano: HotSpot 2020, ITASEC 2020

Gadducci: ICGT 2020

Galicchio: ECML-PKDD 2020, ESANN 2020, ICONIP, IJCAI-PRICAI 2020 2020, IJCNN 2020, LOD 2020, MLDM.it 2020

Guidi: CloudCom 2020, CCNC 2020, SocInfo 2020, eKNOW 2020, ICSNC 2020, GOODTECHS 2020, ISCC 2020

Guidotti: AAAI 2020, AIAT 2020, AIIC 2020, AIxIA 2020, CIKM 2020, DataMod 2020, DSAA 2020, ECAI 2020, ECML-PKDD 2020, FAT* 2020, ICML 2020, IJCAI 2020, NIPS 2020, SDM 2020, SocInfo 2020, XAI 2020 - IJCAI-PRICAI Workshop XAI

Micheli: IJCAI-PRICAI 2020, IEEE WCCI 2020, ICANN 2020, ESANN 2020, ICPRAM 2020, AIXIA 2020

Paganelli: CNSM 2020, NetSoft 2020, NOMS 2020

Pisanti: BIOINFORMATICS 2020, iABC 2020, ICTCS 2020, ISBRA 2020, RDAAPS 2020, SEA 2020, SOFSEM 2020, SPIRE 2020

Prencipe: ALGOSENSORS 2020, SSS 2020

Ricci: Blockchain 2020, ICBC 2020, Complex Network 2020, ICUMT 2020, CloudCom 2020, CryBlock 2020, COINS 2020, IWBOSE 2020, DLT Workshop of Itasec 2020, DAIS 2020

Ruggieri: BIAS 2020, FORC 2020

Sirbu: SocInfo 2020, DSHealth 2020 workshop, LOD 2020

Soldani: AIdSH 2020, AMP 2020, ASPAI 2020, BDIOT 2020, CCIOT 2020, CLOSER 2020, DASA 2020, ECONF 2020, eLmL, ESOC 2020, FOCLASA 2020, ICTS4eHealth 2020, Microservices 2020, SERVICE COMPUTATION 2020, SIoTEC 2020

Torquati: AGERE 2020, HiPC 2020, HLPP 2020, CCGrid 2020, PDP 2020

4.3 Steering Committee membership of conferences

Prencipe: FUN 2020

Torquati: Euro-Par 2020

4.4 Invited speakers at conferences

Bonchi: Invited speaker at the TTCS 2020 conference

Bonchi: Invited speaker at the OWLS 2020 conference

Brogi: Invited speaker at Microservices 2020

Ferragina: Invited speaker at the Compute and Storage Technology 2020 Workshop

Ferragina: Invited speaker at the ICTCS 2020 conference

Gallicchio: Invited speaker at the ICOSST 2020 conference

Poloni: Invited speaker at the STRUCTAPP2020 Workshop

4.5 Tutorial speakers at conferences

Bacciu: Tutorial speaker at the IEEE IJCNN/WCCI 2020 conference

Gallicchio: Tutorial speaker at the IJCNN/WCCI 2020 conference

Gallicchio: Tutorial speaker at the INISTA 2020 conference

4.6 Conference organization

Tutorial chairing of the following international conferences in Computer Science settings:

Guidotti: XAI 2020

Guidotti, Monreale: XDSM 2020

Paganelli: NoF 2020

Local organization of the following international conferences in Computer Science settings:

Bacciu: ACDL 2020

Conte: GM 2020, WEPA 2020

Conte, Grossi, Pisanti, Rosone: ALGO 2020 that included ESA 2020, WABI 2020, ALGOSENSORS 2020, WAOA 2020, ATMOS 2020

4.7 Workshop organization

Gallicchio, Micheli: MLDM.it

Guidi, Ricci: SoNeC 2020

Guidotti, Monreale: XKDD 2020

Paganelli: O4SDI 2020 workshop

Ricci: BRAIN 2020

Sirbu: HMB2020 Workshop

5 Research positions

In order to enhance the research activity of the Department, several research fellow positions have been assigned in 2020 so as to favour the participation of researchers at the very beginning of their scientific career, as well as to foster international collaborations. Specifically (data source: administrative secretariat of the Department):

1. 7 Junior Research grant positions (*Borse di studio e approfondimento* in Italian) have been opened on the following topics:
 - (a) *Algoritmi di ottimizzazione non lineare continua e combinatoria*
 - (b) *Metodi di spiegazione per la classificazione di serie temporali*
 - (c) *Algoritmi e strutture dati per lo sviluppo di piattaforme di mobilità urbana*
 - (d) *Deep learning per dati biomedici*
 - (e) *Analisi di scripts in transazioni bitcoin*
 - (f) *Analisi ed implementazione di un sistema di trust management Ethereum*
 - (g) *Organizzazione della Scientific Challenge del Progetto Minoa*
2. 4 Senior Research grant positions (*Borse di ricerca* in Italian) have been opened on the following topics:
 - (a) *EuroVox: Advanced Neural Machine Translation*
 - (b) *Sperimentazione di tecniche di monitoraggio leggere e auto-adattive su infrastrutture Cloud-IoT*
 - (c) *Data driven analysis of the “Machine Learning and AI on the edge for 4.0 applications” topic by means of Natural language processing techniques*
 - (d) *Incremental type systems for secure compilation*
3. 5 Research fellow positions (*Assegni di ricerca* in Italian) have been opened:
 - (a) 3-year positions:
 - i. *Causality analysis of data for domain-specific bias understanding*
 - ii. *Declarative explanations of black box decisions*
 - (b) 1-year positions:
 - i. *Analysis of complex networks: from theory to applications (Analisi di reti complesse: dalla teoria alle applicazioni)*
 - ii. *Study of international migration through big data analysis, social networks and computational models (Studio della migrazione internazionale tramite analisi di big data, reti sociali e modelli computazionali)*
 - iii. *Studying methods to assess, predict and explain the risk of individual privacy in personal data (Studio di metodi per valutare, predire e spiegare il rischio di privacy individuale in dati personali)*

6 PhD Schools

We report here some basic information on the two PhD Schools managed by the Department. For additional information we refer to the respective web sites:

- PhD School in Computer Science: <https://dottorato.di.unipi.it/>
- PhD School in Data Science: <https://datasciencephd.eu/>

6.1 PhD School in Computer Science

In 2020, the board of the PhD School in Computer Science included the following members:

- **Paolo Ferragina, Coordinator (until October 2020), Antonio Brogi, Coordinator (since November 2020)**, Roberto Barbuti, Stefano Chessa, Marco Danelutto, Gian Luigi Ferrari, Antonio Frangioni, Roberto Grossi, Andrea Lisi (student), Linda Pagli, Corrado Priami, Maria Grazia Scutellà, Andrea Valenti (student) from the Department of Computer Science of the University of Pisa.
- Michele Boreale, Elisa Pergola, Rosario Pugliese from the University of Florence.
- Sara Brunetti, Simone Rinaldi from the University of Siena.
- Massimiliano Ciaramita (LOA - Laboratory for Applied Ontology), Fabio Martinelli (IIT - Institute of Informatics and Telematics), Chiara Renso (ISTI - Information Science and Technology Institute), Paolo Santi (IIT), Roberto Scopigno (ISTI) from National Research Council of Italy (*Consiglio Nazionale delle Ricerche* in Italian).
- Ricardo Baeza-Yates (Northeast University), Sajal Das (Missouri University of Science and Technology), Joshua Guttman (Worcester Polytechnic Institute and MITRE Corporation), Daria Mochly-Rosen (Stanford University) from USA.
- Leo Liberti, Catuscia Palamidessi from the École Polytechnique and CNRS, France.
- Frank Leymann from the University of Stuttgart, Germany.

In 2020, 15 new PhD student positions were opened (Cycle XXXVI), and across that year the PhD students enrolled in the Computer Science PhD were the following ones (arranged per cycle):

- Cycle XXXII: Alamdari Omid Isfahani, Athanasios Rizos, Belli Dimitri, Bondioli Mariasole, Forti Stefano, Moghtasedi Shima, Nasti Lucia, Neri Davide, Parvaneh Parvin, Pellungrini Roberto, Trani Roberto.
- Cycle XXXIII: Busi Matteo, Carta Antonio, Castellana Daniele, Crecchi Francesco, Daoudagh Said, De Mattei Lorenzo, Iommazzo Gabriele, Metilli Daniele, Michienzi Andrea, Oslia Oleksii, Podda Marco, Puccetti Roberto, Rahman Mohsin Ur, Rinaldi Luca, Spataru Adrian Florin, Versari Luca.
- Cycle XXXIV: Alderighi Thomas, Bienhüls Benedikt, Ceragioli Lorenzo, Errica Federico, Miaschi Alessio, Setzu Mattia, Sucameli Irene, Vinciguerra Giorgio.
- Cycle XXXV: Baccini Federica, Bocci Alessandro, Citraro Salvatore, Di Sarli Daniele, Iadarola Giacomo, Lagani Gabriele, Landolfi Francesco, Lisi Andrea, Manolas Iason, Molinari Alessio, Palma Giulia, Punzi Giulia, Rotelli Daniela, Rulli Cosimo, Sansone Francesco, Sattar Asma, Valenti Andrea, Vogel Adriano Jose, Zedda Eleonora.
- Cycle XXXVI: Berti Alessandro, Boffa Antonio, Bussi Laura, Cornacchia Giuliano, De Caro Valerio, Di Giorgio Alessandro, Fuchs Andrew, Gravina Alessio, Loporchio Matteo, Numeroso Danilo, Pedrotti Andrea, Resta Michele, Rucci Davide, Tortorella Domenico, Tosoni Francesco.

6.2 PhD School in Data Science

In 2020, the board of the PhD School in Data Science included the following members:

- **Dino Pedreschi, Coordinator** (Department of Computer Science), Roberta Bracciale (Department of Political Science), Fabio Gadducci (Department of Computer Science), Pier Luigi Lopalco (Department of Translational Research on New Technologies in Medicine and Surgery), Francesco Marcelloni (Department of Information Engineering), Anna Monreale (Department of Computer Science), Nadia Pisanti (Department of Computer Science), Monica Pratesi (Department of Economics & Management), Chiara Maria Angela Roda (Department of Physics), Salvatore Ruggieri (Department of Computer Science) from the University of Pisa.
- Giuseppe Brancato, Alessandro Cellerino, Henrik Koch, Elena Pavan, Sergio Rampino from Scuola Normale Superiore.
- Francesca Chiaromonte, Giovanni Comandé, Tommaso Cucinotta, Andrea Mario Cuore Piccaluga from Sant'Anna School of Advanced Studies.
- Giulio Cimini, Diego Garlaschelli, Tiziano Squartini from IMT School for Advanced Studies, Lucca.
- Marco Conti (IIT - Institute of Informatics and Telematics), Fosca Giannotti (ISTI - Information Science and Technology Institute), Mirco Nanni (ISTI), Raffaele Perego (ISTI), from National Research Council of Italy (*Consiglio Nazionale delle Ricerche* in Italian).
- Janos Kertész from Budapest University of Technology and Economics, Hungary.
- Stan Matwin from Dalhousie University, Canada.
- Albert-László Barabási (Northeastern University), Alex 'Sandy' Pentland from Massachusetts Institute of Technology, from USA.

In 2020, 10 new PhD student positions were opened (Cycle XXXVI), and across that year the PhD students enrolled in the Data Science PhD were the following ones (arranged per cycle):

- Cycle XXXIII: Elisa Ferrari, Luca Insolia, Jisu Kim, Cecilia Panigutti, Tommaso Radicioni, Giorgio Tripodi, Vasiliki Voukelatou, Gevorg Yeghikyan.
- Cycle XXXIV: Agnese Bonavita, Leonardo Niccolò Ialongo, Benedetta Iavarone, Francesca Lizzi, Kilian Ollivier, Ivan Ortiz Rodriguez, German Rodikov, Andrea Somazzi, Giovanni Tonutti.
- Cycle XXXV: Dario Balboni, Francesco Bodria, Silvia Corbara, Andrea Cossu, Andrea Gini, Giacomo Lanciano, Valentina Macchiati, Sara Mazzilli, Francesca Naretto, Anthony Onoja, Giovanni Puccetti.
- Cycle XXXVI: Jose Manuel Alvarez, Mila Andreani, Lorenzo Bellomo, Filippo Galli, Mirko Nardi, Valentina Pansanella, Andrea Pugnana, Francesco Spinnato, Laura State, Jack Tacchi.

7 Visiting Fellows

Thanks to its scientific prestige and highly international profile, the Department of Computer Science often hosts scientific events and seminars that external researchers attend, and research staff of the Department often receives visits of colleagues from other Italian institutions and from abroad. We report here the list of those visiting researchers who have spent at least one month in the Department in 2020 (source: direct communication with the researchers).

Prof. Stan Matwin, Dalhousie University, Canada, visited the Computer Science Department under invitation of Prof. Dino Pedreschi from January to March, 2020.

Dr. Hernan Melgratti, University of Buenos Aires, Argentina, visited the Computer Science Department under invitation of Prof. Roberto Bruni from February 6th to March 9th, 2020. Dr. Melgratti held a 20-hours PhD course entitled “Design-by-Contract and Behavioural Types” in the period 10 to 27 February 2020. (<https://dottorato.di.unipi.it/phd-programme/teaching/phd-courses/phd-courses-2020/>).

Prof. Miguel Atencia, University of Málaga, Spain, visited the Computer Science Department under invitation of Prof. Alessio Micheli and of Dr. Claudio Gallicchio from February to March, 2020.

Some of the above mentioned visits were interrupted due to the pandemic Covid-19 emergency. Moreover, there were three further approved proposals for funding Visiting Fellows, all planned for fall 2020, that were unfortunately canceled or postponed to 2021 due to the Covid-19 emergency.

8 Peer-reviewed publications

In this section we report the complete list of the research products published in 2020 and having members of the Department among the authors. This section has been populated with data taken from the official file sent to the *Area 01 Committee* by the Research Office of the University in January 2021, limited to entries published in 2020, and then integrated with information from the researchers.

8.1 Journal papers

The following papers have been published in peer reviewed international journals in 2020 by the members of the Department:

- [1] V. Acuña, R. Grossi, G. Italiano, L. Lima, R. Rizzi, G. Sacomoto, M. Sagot, and B. Sinaireri. On bubble generators in directed graphs. *Algorithmica*, 82(4):898–914, 2020.
- [2] M. Albano, M. Mordacchini, and L. Ricci. AoI-based multicast routing over Voronoi overlays with minimal overhead. *IEEE Access*, 8:168611–168624, 2020.
- [3] M. Alzamel, L. Ayad, G. Bernardini, R. Grossi, C. Iliopoulos, N. Pisanti, S. Pissis, and G. Rosone. Comparing degenerate strings. *Fundam. Informaticae*, 175(1-4):41–58, 2020.
- [4] L. Anghel, A. Bernasconi, V. Ciriani, L. Frontini, G. Trucco, and E. Vatajelu. Stuck-at fault mitigation of emerging technologies based switching lattices. *J. Electron. Test.*, 36(3):313–326, 2020.
- [5] A. Aristodemo and L. Gemignani. Accelerating the Sinkhorn-Knopp iteration by Arnoldi-type methods. *Calcolo*, 57(1):Paper No. 10, 17, 2020.
- [6] L. K. Ayad, G. Bernardini, R. Grossi, C. Iliopoulos, N. Pisanti, S. Pissis, and G. Rosone. Longest property-preserved common factor: A new string-processing framework. *Theor. Comput. Sci.*, 812:244–251, 2020.
- [7] D. Bacciu and F. Crecchi. Augmenting recurrent neural networks resilience by dropout. *IEEE Trans. Neural Networks Learn. Syst.*, 31(1):345–351, 2020.
- [8] D. Bacciu, F. Errica, and A. Micheli. Probabilistic learning on graphs via contextual architectures. *J. Mach. Learn. Res.*, 21:134:1–134:39, 2020.
- [9] D. Bacciu, F. Errica, A. Micheli, and M. Podda. A gentle introduction to deep learning for graphs. *Neural Networks*, 129:203–221, 2020.
- [10] D. Bacciu, A. Micheli, and M. Podda. Edge-based sequential graph generation with recurrent neural networks. *Neurocomputing*, 416:177–189, 2020.
- [11] D. Baena, J. Castro, and A. Frangioni. Stabilized benders methods for large-scale combinatorial optimization, with application to data privacy. *Manag. Sci.*, 66(7):3051–3068, 2020.
- [12] R. Barbuti, R. Gori, and P. Milazzo. Encoding Boolean networks into reaction systems for investigating causal dependencies in gene regulation. *Theoretical Computer Science*, 2020.
- [13] R. Barbuti, R. Gori, P. Milazzo, and L. Nasti. A survey of gene regulatory networks modelling methods: from differential equations, to Boolean and qualitative bioinspired models. *J. Membr. Comput.*, 2(3):207–226, 2020.
- [14] P. Baronti, P. Barsocchi, S. Chessa, A. Crivello, M. Girolami, F. Mavilia, and F. Palumbo. Remote detection of social interactions in indoor environments through bluetooth low energy beacons. *J. Ambient Intell. Smart Environ.*, 12(3):203–217, 2020.
- [15] D. Basile, M. ter Beek, P. Degano, A. Legay, G. Ferrari, S. Gnesi, and F. Di Giandomenico. Controller synthesis of service contracts with variability. *Sci. Comput. Program.*, 187:102344, 2020.

- [16] D. Belli, S. Chessa, A. Corradi, L. Foschini, and M. Girolami. Optimization strategies for the selection of mobile edges in hybrid crowdsensing architectures. *Comput. Commun.*, 157:132–142, 2020.
- [17] D. Belli, S. Chessa, L. Foschini, and M. Girolami. A probabilistic model for the deployment of human-enabled edge computing in massive sensing scenarios. *IEEE Internet Things J.*, 7(3):2421–2431, 2020.
- [18] D. Belli, S. Chessa, L. Foschini, and M. Girolami. The rhythm of the crowd: Properties of evolutionary community detection algorithms for mobile edge selection. *Pervasive Mobile Comput.*, 67:101231, 2020.
- [19] G. Bernardini, N. Pisanti, S. Pissis, and G. Rosone. Approximate pattern matching on elastic-degenerate text. *Theor. Comput. Sci.*, 812:109–122, 2020.
- [20] R. Bevilacqua, G. Del Corso, and L. Gemignani. Efficient reduction of compressed unitary plus low rank matrices to Hessenberg form. *SIAM J. Matrix Anal. Appl.*, 41(3):984–1003, 2020.
- [21] R. Bevilacqua, G. Del Corso, and L. Gemignani. Fast QR iterations for unitary plus low rank matrices. *Numerische Mathematik*, 144(1):23–53, 2020.
- [22] C. Bodei, L. Brodo, and R. Bruni. The link-calculus for open multiparty interactions. *Inf. Comput.*, 275:104587, 2020.
- [23] M. Bogo, J. Soldani, D. Neri, and A. Brogi. Component-aware orchestration of cloud-based enterprise applications, from TOSCA to docker and kubernetes. *Softw. Pract. Exp.*, 50(9):1793–1821, 2020.
- [24] M. Bogo, J. Soldani, D. Neri, and A. Brogi. Fine-grained management of cloud-native applications, based on TOSCA. *Internet Technol. Lett.*, 3(5), 2020.
- [25] M. Bordin, D. Griebler, G. Mencagli, C. Geyer, and L. Fernandes. Dspbench: A suite of benchmark applications for distributed data stream processing systems. *IEEE Access*, 8:222900–222917, 2020.
- [26] A. Brogi, A. Bucchiarone, R. Capilla, P. Jamshidi, M. Leotta, Z. Mann, M. Mongiello, and F. Nocera. Ensemble-based software engineering for modern computing platforms. *ACM SIGSOFT Softw. Eng. Notes*, 45(1):28–30, 2020.
- [27] A. Brogi, S. Forti, C. Guerrero, and I. Lera. How to place your apps in the fog: State of the art and open challenges. *Softw. Pract. Exp.*, 50(5):719–740, 2020.
- [28] R. Bruni, R. Giacobazzi, R. Gori, I. Garcia-Contreras, and D. Pavlovic. Abstract extensionality: on the properties of incomplete abstract interpretations. *Proc. ACM Program. Lang.*, 4(POPL):28:1–28:28, 2020.
- [29] R. Bruni, H. Melgratti, and U. Montanari. Bayesian network semantics for Petri nets. *Theor. Comput. Sci.*, 807:95–113, 2020.
- [30] P. Cappanera, C. Requejo, and M. Scutellà. Temporal constraints and device management for the skill VRP: mathematical model and lower bounding techniques. *Comput. Oper. Res.*, 124:0–19, 2020.
- [31] V. Casarosa, S. Ruggieri, E. Salvatori, M. Simi, and S. Turbanti. Educational ecosystems for information science: The case of the university of pisa. *Educ. Inf.*, 36(2):119–138, 2020.
- [32] L. Cerina, M. Santambrogio, G. Franco, C. Gallicchio, and A. Micheli. Echobay: Design and optimization of echo state networks under memory and time constraints. *ACM Trans. Archit. Code Optim.*, 17(3):22:1–22:24, 2020.
- [33] G. Cignoni and F. Gadducci. Pisa, 1954-1961: Assessing key stages of a seminal Italian project. *IEEE Ann. Hist. Comput.*, 42(2):6–19, 2020.

- [34] A. Ciuffoletti. Stateless IoT. *Inf.*, 11(2):85, 2020.
- [35] A. Ciuffoletti. Teaching networks to digital humanists. *IEEE Trans. on Education*, pages 1–8, 2020.
- [36] M. Cococcioni, A. Cudazzo, M. Pappalardo, and Y. Sergeyev. Solving the lexicographic multi-objective mixed-integer linear programming problem using branch-and-bound and grossone methodology. *Commun. Nonlinear Sci. Numer. Simul.*, 84:105177, 2020.
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- [38] A. Conte, R. Grossi, and A. Marino. Large-scale clique cover of real-world networks. *Inf. Comput.*, 270, 2020.
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- [41] A. Corradini, D. Duval, R. Echahed, F. Prost, and L. Ribeiro. Algebraic graph rewriting with controlled embedding. *Theor. Comput. Sci.*, 802:19–37, 2020.
- [42] G. Costa, L. Galletta, P. Degano, D. Basin, and C. Bodei. Natural projection as partial model checking. *J. Autom. Reason.*, 64(7):1445–1481, 2020.
- [43] G. D’Angelo, M. D’Emidio, S. Das, A. Navarra, and G. Prencipe. Asynchronous silent programmable matter achieves leader election and compaction. *IEEE Access*, 8:207619–207634, 2020.
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- [45] A. Datta, P. Ferragina, L. Larmore, L. Pagli, and G. Prencipe. Linear time distributed swap edge algorithms. *Inf. Process. Lett.*, 161:105979, 2020.
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- [47] D. Di Sarli, C. Gallicchio, and A. Micheli. Text classification by untrained sentence embeddings. *Intelligenza Artificiale*, 14(2):245–259, 2020.
- [48] P. Favati, G. Lotti, O. Menchi, and F. Romani. A model for the frequency distribution of multi-scale phenomena. *Inf.*, 11(12):580, 2020.
- [49] P. Ferragina and G. Vinciguerra. The PGM-index: a fully-dynamic compressed learned index with provable worst-case bounds. *Proc. VLDB Endow.*, 13(8):1162–1175, 2020.
- [50] E. Ferrari, A. Retico, and D. Bacciu. Measuring the effects of confounders in medical supervised classification problems: the confounding index (CI). *Artif. Intell. Medicine*, 103:101804, 2020.
- [51] S. Forti, G. Ferrari, and A. Brogi. Secure cloud-edge deployments, with trust. *Future Gener. Comput. Syst.*, 102:775–788, 2020.
- [52] S. Forti, A. Pagiario, and A. Brogi. Simulating fogdirector application management. *Simul. Model. Pract. Theory*, 101:102021, 2020.
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- [56] R. Giancarlo, G. Manzini, A. Restivo, G. Rosone, and M. Sciortino. The alternating BWT: an algorithmic perspective. *Theor. Comput. Sci.*, 812:230–243, 2020.
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- [79] A. Narzisi, M. Bondioli, F. Pardossi, L. Billeci, M. Buzzi, M. Buzzi, M. Pinzino, C. Senette, V. Semucci, A. Tonacci, F. Uscidda, B. Vagelli, M. Giuca, and S. S. Pelagatti. “mom let’s go to the dentist!” preliminary feasibility of a tailored dental intervention for children with autism spectrum disorder in the Italian public health service. *Brain Sciences*, 10(7), 2020.
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- [81] R. D. Nicola, G. Ferrari, R. Pugliese, and F. Tiezzi. A formal approach to the engineering of domain-specific distributed systems. *J. Log. Algebraic Methods Program.*, 111:100511, 2020.
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- [91] B. Qureshi, F. Kamiran, A. Karim, S. Ruggieri, and D. Pedreschi. Causal inference for social discrimination reasoning. *J. Intell. Inf. Syst.*, 54(2):425–437, 2020.
- [92] M. U. Rahman, B. Guidi, and F. Baiardi. Blockchain-based access control management for decentralized online social networks. *J. Parallel Distributed Comput.*, 144:41–54, 2020.
- [93] A. Ramponi, S. Giampiccolo, D. Tomasoni, C. Priami, and R. Lombardo. High-precision biomedical relation extraction for reducing human curation efforts in industrial applications. *IEEE Access*, 8:150999–151011, 2020.
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- [95] A. Rossi, D. Pedreschi, D. Clifton, and D. Morelli. Error estimation of ultra-short heart rate variability parameters: Effect of missing data caused by motion artifacts. *Sensors*, 20(24):7122, 2020.
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8.2 Conference papers

The following papers have been published in proceedings of national and international conferences in 2020 by the members of the Department:

- [1] M. Alzamel, A. Conte, S. Denzumi, R. Grossi, C. S. Iliopoulos, K. Kurita, and K. Wasa. Finding the anticover of a string. In I. L. Gørtz and O. Weimann, editors, *Proceedings of the 31st Annual Symposium on Combinatorial Pattern Matching, (CPM 2020)*, volume 161 of *LIPICs*, pages 2:1–2:11, 2020.
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- [103] V. Yussupov, U. Breitenbücher, C. Krieger, F. Leymann, J. Soldani, and M. Wurster. Pattern-based modelling, integration, and deployment of microservice architectures. In *24th IEEE International Enterprise Distributed Object Computing Conference, EDOC*, pages 40–50. IEEE, 2020.

8.3 Book chapters

The following book chapters have been published in 2020 by the members of the Department:

- [1] E. Arganese, A. Fantechi, S. Gnesi, and L. Semini. Nuts and bolts of extracting variability models from natural language requirements documents. In S. Jarzabek, A. Poniszewska-Maranda, and L. Madeyski, editors, *Integrating Research and Practice in Software Engineering*, volume 851 of *Studies in Computational Intelligence*. Springer, 2020.
- [2] D. Bacciu and A. Micheli. *Deep Learning for Graphs*. Springer, 2020.
- [3] P. Ferragina and G. Vinciguerra. *Learned Data Structures*. Springer, 2020.
- [4] G.-L. Ferrari, M. Danelutto, and D. De Sensi. *Web*. Pisa University Press, 2020.
- [5] C. Flick and V. Ambricola. *Big Data: Eles são um bem comum?* Editora D’Plácido, 2020.
- [6] A. Frangioni. *Standard Bundle Methods: Untrusted Models and Duality*. Springer, 2020.
- [7] A. Frangioni and L. Galli. *Optimization Methods: an Applications-Oriented Primer*. Springer, 2020.
- [8] C. Gallicchio and S. Scardapane. Deep randomized neural networks. In L. Oneto, N. Navarin, A. Sperduti, and D. Anguita, editors, *Recent Trends in Learning From Data: Tutorials from the INNS Big Data and Deep Learning Conference (INNSBDDL2019)*. Springer, 2020.

8.4 Editorships

8.4.1 Conferences Proceedings

The following conferences proceedings have been edited in 2020 by the members of the Department:

- [1] C. Bodei and P. Finelli, editors. *1839: La prima Riunione degli Scienziati Italiani. Atti della giornata di studi tenuta a 180 anni di distanza*. Edizioni ETS, Pisa, 2020.
- [2] A. Brogi, W. Zimmermann, and K. Kritikos, editors. *Service-Oriented and Cloud Computing - 8th IFIP WG 2.14 European Conference, ESOC 2020, Heraklion, Crete, Greece, September 28-30, 2020, Proceedings*, volume 12054 of *Lecture Notes in Computer Science*. Springer, 2020.
- [3] M. Farach-Colton, G. Prencipe, and R. Uehara, editors. *10th International Conference on Fun with Algorithms, FUN 2021, May 30 to June 1, 2021, Favignana Island, Sicily, Italy*, volume 157 of *LIPICs*. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020.
- [4] F. Gadducci and T. Kehrer, editors. *Graph Transformation - 13th International Conference, ICGT 2020, Held as Part of STAF 2020, Bergen, Norway, June 25-26, 2020, Proceedings*, volume 12150 of *Lecture Notes in Computer Science*. Springer, 2020.
- [5] M. Hildebrandt, C. Castillo, E. Celis, S. Ruggieri, L. Taylor, and G. Zanfir-Fortuna, editors. *FAT* '20: Conference on Fairness, Accountability, and Transparency, Barcelona, Spain, January 27-30, 2020*. ACM, 2020.

- [6] C. Kingsford and N. Pisanti, editors. *20th International Workshop on Algorithms in Bioinformatics, WABI 2020, September 7-9, 2020, Pisa, Italy (Virtual Conference)*, volume 172 of *LIPICs*. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2020.
- [7] C. Musto, D. Magazzeni, S. Ruggieri, and G. Semeraro, editors. *Proceedings of the Italian Workshop on Explainable Artificial Intelligence co-located with 19th International Conference of the Italian Association for Artificial Intelligence, XAI.it@AIxIA 2020, Online Event, November 25-26, 2020*, volume 2742 of *CEUR Workshop Proceedings*, 2020.
- [8] M. Sabetzadeh, A. Vogelsang, S. Abualhaija, M. Borg, F. Dalpiaz, M. Daneva, N. Condori-Fernández, X. Franch, D. Fucci, V. Gervasi, E. C. Groen, R. S. S. Guizzardi, A. Herrmann, J. Horkoff, L. Mich, A. Perini, and A. Susi, editors. *Joint Proceedings of REFSQ-2020 Workshops, Doctoral Symposium, Live Studies Track, and Poster Track co-located with the 26th International Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2020), Pisa, Italy, March 24, 2020*, volume 2584 of *CEUR Workshop Proceedings*, 2020.

8.4.2 Books

The following books have been edited in 2020 by the members of the Department:

- [1] C. Bodei, F. Gadducci, and G. Lettieri. *Hello world! L'informatica dall'aritmometro allo smartphone*. Pisa University Press, 2020.
- [2] G. Ferrari. *Storie da cui s'impara. L'avventura pisana dell'Informatica*. Pisa University Press, 2020.
- [3] N. Hadjidimitriou, A. Frangioni, T. Koch, and A. Lodi. *Mathematical Optimization for Efficient and Robust Energy Networks*, volume 4 of *AIRO Springer Series*. Springer, 2020.

8.4.3 Journals

The following journals have been edited in 2020 by the members of the Department:

- [1] M. Aldinucci, V. Cardellini, G. Mencagli, and M. Torquati. Data stream processing in HPC systems: New frameworks and architectures for high-frequency streaming. *Parallel Comput.*, 98:102694, 2020.
- [2] S. Hautphenne, M. g. M. O'Reilly, and F. Poloni. Special issue for 10th International Conference on Matrix-Analytic Methods for Stochastic Models. *Stoch. Models*, 36(2):173–175, 2020.
- [3] H. Ito, S. Leonardi, L. Pagli, and G. Prencipe. Special issue on FUN. *Theor. Comput. Sci.*, 842:131, 2020.
- [4] J. Jacquet and J. Soldani. Special issue on foundations of coordination languages and self-adaptive systems (foclasa 2018). *Sci. Comput. Program.*, 191:102417, 2020.
- [5] N. Pisanti, C. J. Colbourn, and R. Grossi. Special issue for selected papers from international workshop on combinatorial algorithms (IWCA 2019). *Theory Comput. Syst.*, 64(7):1155–1157, 2020.