

## ALLEGATO A

UNIVERSITÀ DEGLI STUDI DI MILANO

Procedura di selezione per la chiamata a professore di II fascia da ricoprire ai sensi dell'art. 18, comma 1, della Legge n. 240/2010 per il settore concorsuale \_01/B1 - Informatica \_\_\_\_\_,  
(settore scientifico-disciplinare INF/01 - Informatica \_\_\_\_\_)  
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## [Laura Toni] CURRICULUM VITAE

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	TONI
NOME	LAURA
DATA DI NASCITA	[ 25, 03, 1982]

INSERIRE IL PROPRIO CURRICULUM  
(non eccedente le 30 pagine)

# Curriculum Vitae of Dr. Laura Toni

## Assistant Professor

### Contacts:

#### Work

Electronic & Electrical Engineering Department  
University College London  
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ORCID ID: <https://orcid.org/0000-0002-8441-8791>

### Education and Titles

- **2020 – Italian national scientific habilitation (ASN) as Assistant Professor (Seconda Fascia) in Telecomunicazione – Settore disciplinare: 09/F2**
- **PhD in Electronics, Computer Science and Telecommunications**  
**2006 – 2009 University of Bologna, Bologna, Italy**  
  
Research Title: *Adaptive wireless multimedia communication systems*  
Supervisor: Prof. Oreste Andrisano
- **MSc in Electrical Engineering**  
**2003 – 2005 University of Bologna, Bologna, Italy**  
  
Final Dissertation Title: *Short range digital communication systems*  
Supervisor: Prof. Oreste Andrisano  
**Final Mark: 110/110 cum laude (top 5 in a cohort of 100 students).**
- **BEng in Electrical Engineering**  
**2000 – 2003 University of Bologna, Bologna, Italy**  
  
Final Dissertation Title: *Effects of frame synchronization errors on the quality of MPEG-4 stream video*  
Supervisor: Prof. Marco Chiani  
**Final Mark: 106/110**

### Career Experience

- **Lecturer**  
**July 2016 – Present**  
**Electronic and Electrical Engineering Department, University College London (UCL)**  
  
*Since appointed at UCL, I have established a new research activity focused on developing novel adaptive strategies for large-scale networks with applications including adaptive streaming strategies for virtual reality services, data-efficient multi-arm bandit problems for online recommendation systems, graph-based reinforcement learning for AI systems, and influence maximization over social networks.*
- **Senior Postdoc**  
**2012 – 2016**  
**École Polytechnique Fédérale de Lausanne (EPFL)**  
  
*In the LST4 lab (led by Prof. Pascal Frossard), I applied online learning strategies and adaptive algorithms*

*to multimedia streaming processing and interactive communication systems.*

- **Postdoc**  
**2011 – 2012**  
**Electrical Engineering Department, University of California, San Diego, USA**

*As a postdoc in Prof. Laurence Milstein's and Pamela Cosman's lab, I developed and applied advanced multimedia processing techniques for Quality of Experience optimization.*

- **Senior Engineer**  
**2009 – 2011**  
**TeleRobotic and Application (TERA) Lab – Italian Institute of Technology**

*In the TERA Lab I developed wireless protocols and adaptive multimedia systems for autonomous and underwater vehicles as well as for autonomous robot (mainly quadrupeds).*

## **Career Breaks**

- **January 2015 – June 2015:** maternity leave.
- **October 2017 – June 2018:** maternity leave.

# Research Experience

Dr. Laura Toni is Lecturer at the Electronic Engineering Department at UCL and Senior Member of IEEE. Her major contributions are in the area of large-scale signal processing, and machine learning for immersive communications and networks. She has (co)-authored over 60 high-impact publications on multimedia systems, signal processing and machine learning, and she is co-inventor of 2 patents on low-delay video processing and streaming.

She is significantly involved in scientific committees of world-leading conferences/journals (e.g., Associate Editor of the IEEE Trans. on Image Processing and Eurasip Journal on Advances in Signal Processing, General Co-chair of ACM MMSys 2020, Tutorial Chair ACM MM 2020, TPC chair of ACM MMSys 2019, etc.). She has a strong collaboration with industrial partners via the Cisco Academic grant (on online optimization on irregular domains for IoTs), the Adobe System academic donation (on graph-based processing for point clouds), and the CTI project between EPFL and Cisco Research Labs (Rolle), which she co-led and led to a patent.

## Funding (*finanziamenti competitivi in qualità di responsabile di progetto*)

She has been PI /Co-I in over 5 projects sponsored by EPSRC, Royal Society, and industrial partners with cumulative funding for her research exceeding £300k in the last 3 years.

### Funding as main PI

- **Cisco Academic Funds** for the research project “*Self-Learning Networks for Dynamic IoT Traffic*” (\$99,000), 2019-2020. Funding one PhD student in my group for three years plus equipment and travels.
- **Adobe Donation** for the research project “*User-Centric Spherical Adaptive Streaming for Immersive Communications*” (\$50,000), 2017-2018. Funding collaborative research between UCL and Adobe San Jose'- USA.
- **IES Royal Society** for the research collaborative project “*User-centric Omnidirectional Video Streaming for VR*” (£12,000), 2018-2020. Funding travels between UCL and CWI.
- **Overseas Research Scholarship, UCL**. “Large Scale Recommendation Systems” (£74,720), 2018-202 (40 awards annually across all UCL faculties). Funding one PhD student in my group for four years.
- **Doctoral Training Partnerships Scholarship, EPSRC**. “Data-efficient reinforcement learning” (£90,672), 2017-2012. Funding one PhD student in my group for four years plus travels.
- **UCL Feature Leaders Award** “Graph-based learning for IoT networks” (£59,000), 2016, funding a 6-months long internship position plus equipment.

### Funding as co-PI

- **Newton Advanced Fellowships** (Royal Society) for the research collaborative project “*Human QoE vs. Machine QoE: Being Content in Video Applications*”, (£72,075.00), 2020-2022. Funding 10%FTE of my time, and 1 year 100%FTE researcher, and travel between UK and Turkish universities.
- **EPSRC Capital Award for Early Career Researchers**, “Simulator for autonomous driving”, (£99'000)
- **LiDO PhD Scholarship**: “Vaccine development through graph-based machine learning generated host-pathogen interactome” (£90,672). Funding one PhD student between Royal Veterinary College and UCL.

## Prizes and Awards (*premi e riconoscimenti nazionali e internazionali per attività di ricerca*)

- **IEEE ComSoc travel grant** for the Women's Workshop on Communications (\$3,000), 2012.
- **Marco Polo scholarship travel grant** (€8,000), 2007.

- **UCL-Grand Challenges & French Embassy Grant, to support to workshop organization** “The power of graphs in machine learning and sequential decision-making” <https://graphpower.inria.fr> (£6,000), 2019.
- **New Initiatives for SIGMM Activities**, funding for travel support for young talented researchers and for the organization of the first “women in SIGMM” luncheon event organized at an MMSys conference, (\$18,000), 2019.
- **Cisco Prize Best Poster** award to Silvia Rossi’s for Adaptive Streaming for Immersive Communication’, UCL Mildner Lecture, 2018.
- **IEEE best 10% paper award** for: C. Li, L. Toni, et al., “Complexity Constrained Representation Selection for Dynamic Adaptive Streaming”, VCIP, Chengdu, China, 2016.
- **IEEE Best paper award** for: S. D’Aronco, L. Toni and P. Frossard, “Price-based Controller for Quality-Fair HTTP Adaptive Streaming”, IEEE ISM, San Jose, USA, 2016.
- **ACM best 10% paper award** for: L. Toni, N. Thomos and P. Frossard. “Interactive Free Viewpoint Video Streaming Using Prioritized Network Coding”. IEEE MMSP, Pula (Sardinia), Italy, 2013.
- **IEEE/IFIP best paper award** for: L. Sorbi, L. Toni, et al., “Communication in a behaviour-based approach to target detection and tracking with Autonomous Underwater Vehicles”, the 4th IEEE/IFIP UUWSN 2010, Hong Kong (China), 2010.

## Group Supervision (*organizzazione, direzione e coordinamento di centri o gruppi di ricerca*)

Dr. Toni is the leading PI of the LASP (learning and signal processing) group working at the crossroad between machine learning, multimedia processing, and signal processing. She is currently supervising a team of 4 PhD students (as main supervisor), 1 postdoc, and 4 MSc students. LASP has established collaborations with many Electronic Engineers, as well as with chemical engineers, computer scientists, Bioinformatics, and companies such as Adobe, Intel, Cisco, Netflix, DeepMind, and IBM. Our research career has been supported also by the EPSRC Future Leaders Award, Royal Society, EPSRC, Cisco and Adobe Donation. LASP’s research has led to journal and key conferences publications, as well as key internship positions at DeepMind, IBM, INRIA-Lille, CWI, and Google-Zurich. LASP group webpage is <https://laspucl2016.com>.

### PhD Supervision

1. Pedro Gomes, 2020-present, **UCL**, “Graph Learning for Volumetric Video Processing”.
2. Kaige Yang, 2018-present, **UCL**, “*Graph-Based Bandits*”.
3. Sephora Madjiheurem, 2017-present, **UCL**, “*Data-Efficient Reinforcement Learning*”.
4. Silvia Rossi, 2017-present, **UCL**, “*Learning Users Interactivity in VR Systems*”.
5. Stefano D’Aronco (co-advisor), 2013-2018, **EPFL**, “*Network utility maximization for delay-sensitive applications in unknown communication settings*”.
6. Ana De Breu (co-advisor), 2015, **EPFL**, “*Optimized Coding Strategies for Interactive Multiview Video*”.
7. ElHadi Charkoui (co-advisor), 2012, **IIT**, “Adaptive Routing and Protocols for Underwater Communications”.
8. Laura Sorbi (co-advisor), 2012, **IIT**, “Mission Planner for Cooperative Autonomous Underwater Vehicle”.

### PostDoc Supervision

1. Gholamali Aminian (co-supervision with Prof. M. Rodrigues), 2020-2022, **UCL**, “Information-Theoretic Foundations of Deep Learning”.

### Master Student Projects Supervision (*tesi di laurea*):

1. Wang Han, “Learning on Graph Representation for Meta Reinforcement Learning”, 2020
2. Xie Zhidian, “Machine Learning for Predicting Users’ Behaviour in Virtual Reality”, 2020
3. Wu Xudong, “Research projects at BBC London”, 2020
4. Guo Hao, “Action elimination in reinforcement learning”, 2020

5. Liao Wenting, "Graph-based Learning for Recommendation System", 2019
6. Luo Jiesi, "Representation Learning on Graphs", 2019
7. Meng Hao, "Influence Maximization in Social Networks", 2019
8. Shi Jiahao, "Graph Based Learning for Drug Design", 2019
9. LiuWeiqiu, "Adaptive Streaming over HTTP platform implementation", 2018
10. Wang Zhao, "Graph-based Learning for Recommendation Systems", 2018
11. Xie Ximing, "Geometric Deep Neural Network", 2018
12. Chen Xuan, "Predicting Users Behavior in Virtual Reality", 2018
13. Yan Yi, "Predicting Users' Behaviour in Virtual Reality", 2017
14. Kaige Yang, "Graph-based Learning for Recommendation Systems", 2017

#### **Unergrad Student Projects Supervision (*tirocinio*):**

1. Vincent Tan, 3rd year project, 2020
2. Sultan Kenjeiev, 3rd year project, 2020
3. Candice Hughes, 3rd year project, 2019
4. Dhaval Vyas, 3rd year project, 2019
5. Myles Foley, 3rd year project, 2019
6. Zhidian Xie, 3rd year project, 2019
7. Jiaojiao Ma, 4th year project, 2019
8. Chenchao Li, 4th year project, 2019
9. Zi Wang, 4th year project, 2019
10. Hening Zhang, 4th year project, 2019

#### **Editorial Activities (*comitati editoriali di riviste scientifiche*)**

- Associated editor for EURASIP Journal on Advances in Signal Processing
- Associated editor for IEEE Transaction on Image Processing
- Guest editor for "IEEE COMSOMTC E-Letter" special issue on interactive multi-view video services: from acquisition to rendering, 2016.
- Guest editor for "ACM Transactions on Multimedia Computing, Communications, and Applications" on Best Papers from the ACM Multimedia Systems (MMSys) 2019 and Co-Located Workshops, 2020.

#### **Commissions of Trust (*appartenenza ad accademie scientifiche*)**

- Member of the **SIGMM Student travel grants** committee, 2019-present
- Member of the **IET Proposal** committee, 2019-present
- **EPSRC Proposal** reviewer, 2018-present
- Member of the **EURASIP JASP Best Paper Award** committee, 2019-present
- IEEE MMSP (*Multimedia Signal Processing*) Technical Committee (**MMTC**)
- **IEEE Senior Member**, 2019-present
- **IEEE Member**, 2012-2019

#### **Organization of Scientific Meetings**

- **Tutorial Co-Chair of ACM Multimedia 2020**
- **Diversity and Inclusion Chair of PIMRC 2020**
- **General Co-Chair of ACM MMSys 2020 Conference**
- **AC IMX 2020**

- **General Chair** of "The power of graphs in machine learning and sequential decision-making" workshop, in collaboration with Lille – France, July 2019.
- **TPC Co-Chair of ACM MMSys 2019 Conference.** Top-tier conference in multimedia systems, with a unique opportunity to interact both with academics and industrial partners. \$18'500 funding obtained for organizing the first women in SIGMM event at a MMSys conference
- **Co-Organizer of IEEE Women's Workshop on Communications and Signal Processing.** I attended the workshop on 2012 and I was part of the organizing committee for the second one held in 2014 at Princeton University.
- **Review activities:** I served as reviewer for the main journals and conferences recognized in my research domain.  
 IEEE Transactions on Communication, IEEE Transactions on Broadcasting, IEEE Communication Letters, IEEE Signal Processing Letters, Image and Signal Processing, IEEE Transactions on Image Processing, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Multimedia, IEEE Transactions on Signal Processing, Journal of Visual Communication and Image Representation  
 NeurIPS, ICLR, AISTATS, IEEE INFOCOM, IEEE ICIP, IEEE ICASSP, IEEE ICME, IEEE GLOBECOM, IEEE ICC, IEEE VTC, IEEE WCNC, IEEE MMSP, ACM Multimedia, IEEE GlobalSIP
- **TPC Member activity:** I served as TPC member for the main conferences recognized in my research domain such as IEEE ICIP, IEEE ICASSP, IEEE ICME, IEEE GLOBECOM, IEEE ICC, IEEE MMSP, ACM MMSys, ACM MM.
- **Chairing Sessions:** ICASSP 2020, MMSys 2019, IEEE ISWCS 2009, SPAW 2008.

## Invited Seminars

- **Invited talk at Deepmind,** "Graph Representation Learning for Data-Efficiency Reinforcement Learning", November 2019, UK.
- **Multi-Arm Bandit Workshop – Lancaster/DeepMind,** "Laplacian-regularized Graph Bandits", September 2019, UK.
- **Graph Signal Processing Workshop – INRIA,** Rennes, "Graph-Based Contextual Online Learning", April 2019, France.
- **Immersive streaming Workshop – IMT Atlantique,** "User-centric networks for immersive communications", October 2018, France.
- **Invited talk at Kingston University,** "Navigation-Aware Communications for Interactive Multiview Video Systems", December 2016, UK.
- **Invited talk at Trinity College,** "Navigation-Aware Communications for Interactive Multiview Video Systems", April 2016, Ireland.

## Patents (*brevetti*)

1. US-9,549,016, "CONGESTION CONTROL FOR MEDIA FLOWS", S. Mena De La Cruz, L. Toni, S. D'aronco, December 2016.
2. TO2010A000311, "Procedimento di codifica/decodifica di segnali video/immagine con descrizione multipla e relativo apparato di codifica/decodifica", L. Rossi and L. Toni, April 2010.

## Complete List of Peer-Reviewed Publications

**Publications:** 21 peer-reviewed journals, 37 peer-reviewed conferences

**H-index:** 16 (Google Scholar, May 2020)

**Total Citations:** 809 (Google Scholar, May 2020)

**Year of First Publication:** 2009

### Peer-reviewed Journals

[\*] As corresponding author

[\*\*] As senior author

1. [**\*\***] "Do Users Behave Similarly in VR? Investigation of the User Influence on the System Design"  
S. Rossi, C. Ozcinar, A. Smolic, **L. Toni**  
**2020**. ACM Transactions on Multimedia Computing, Communications, and Applications,  
<https://doi.org/10.1145/3381846>
2. "Adaptive Streaming in Interactive Multiview Video Systems"  
X. Zhang, **L. Toni**, P. Frossard, Y. Zhao, and C. Lin  
**2018**. IEEE Transactions on IEEE Transactions on Circuits and Systems for Video Technology
3. "QoE Driven Mobile Edge Caching Placement for Adaptive Video Streaming"  
C. Li, **L. Toni**, J. Zou, H. Xiong, and P. Frossard  
**2018**. IEEE Transactions in Multimedia, vol. 20, no 4, pp. 965 - 984
4. [**\***] "Optimal Representations for Adaptive Streaming in Interactive Multi-View Video Systems"  
**L. Toni**, P. Frossard  
**2017**. IEEE Transactions on Multimedia, vol. 19, no 12, pp. 2775-2787
5. "Delay-Power-Rate-Distortion Optimization of Video Representations for Dynamic Adaptive Streaming"  
C. Li, **L. Toni**, P. Frossard, H. Xiong and J. Zou  
**2018**. IEEE Transactions on Circuits and Systems for Video Technology, vol. 28, no 7, pp. 1648 – 1664.
6. "Price-based Controller for Utility-aware HTTP Adaptive Streaming"  
S. D'Aronco, **L. Toni** and P. Frossard  
**2017**. IEEE Multimedia, vol. 24, no 2, pp. 20-29
7. "Improved Utility-based Congestion Control for Low-Delay Communication"  
S. D'Aronco, **L. Toni**, S. Mena, X. Zhu and P. Frossard  
**2017**. IEEE/ACM Transactions on Networking, vol. 25, no 1, pp. 349 - 362



8. [\*] "In-Network View Synthesis for Interactive Multiview Video Systems"  
**L. Toni**, G. Cheung and P. Frossard  
**2016**. IEEE Transactions on Multimedia, vol.18, no.5, pp. 852-864
9. [\*] "Prioritized Random MAC Optimization via Graph-based Analysis"  
**L. Toni** and P. Frossard  
**2015**. IEEE Transactions on Communications, vol. 63, p. 5002-5013
10. "Optimal Layered Representation for Adaptive Interactive Multiview Video Streaming"  
De Abreu, **L. Toni**, T. Maugey, N. Thomos, P. Frossard and F. Pereira  
**2015**. Journal of Visual Communication and Image Representation, vol. 33, p. 255- 264
11. [\*] "Optimized Packet Scheduling in Multiview Video Navigation Systems"  
**L. Toni**, T. Maugey and P. Frossard  
**2015**. IEEE Transactions on Multimedia, vol. 17, num. 9, p. 1604 -1616
12. [\*] "Optimal Selection of Adaptive Streaming Representations"  
**L. Toni**, R. Aparicio-Pardo, K. Pires, G. Simon, A. Blanc and P. Frossard  
**2015**. ACM Transactions on Multimedia Computing, Communications and Applications, vol. 11, no 2
13. "Resource Allocation and Performance Analysis for Multiuser Video Transmission over Doubly Selective Channels"  
D. Wang, **L. Toni**, P. Cosman and L. Milstein  
**2015**. IEEE Transactions on Wireless Communications, vol. 14, num. 4, p. 1954-1966
14. [\*] "Correlation-Aware Packet Scheduling in Multi-Camera Networks"  
**L. Toni**, T. Maugey and P. Frossard  
**2014**. IEEE Transactions on Multimedia, vol. 16, num. 2, p. 496-509
15. "Multi-Criteria Optimization of Access Selection to Improve the Quality of Experience in Heterogeneous Wireless Access Network"  
Q.-T. Nguyen-Vuong, N. Agoulmine, E. H. Cherkaoui and **L. Toni**  
**2013**. IEEE Transactions on Vehicular Technology, vol. 62, num. 4, p. 1785 – 1800
16. "Uplink Resource Management for Multiuser OFDM Video Transmission Systems: Analysis and Algorithm Design"  
D. Wang, **L. Toni**, P. Cosman and L. Milstein  
**2013**. IEEE Transactions on Communications, vol. 61, num. 5, p. 2060 – 2073
17. [\*] "Channel Coding Optimization Based on Slice Visibility for Transmission of Compressed Video over OFDM Channels"  
**L. Toni**, P. Cosman and L. Milstein  
**2012**. IEEE Journal on Selected Areas in Communications, vol. 30, num. 7, p. 1172 – 1183
18. [\*\*] "A Behavior-Based Mission Planner for Cooperative Autonomous Underwater Vehicles"  
L. Sorbi, G. De Capua, J.-G. Fontaine and **L. Toni**  
**2012**. Marine Technology Society Journal, vol. 46, num. 2, p. 32-44

19. **[\*]** "Does Fast Adaptive Modulation Always Outperform Slow Adaptive Modulation?"  
**L. Toni** and A. Conti  
**2011.** IEEE Transactions on Wireless Communications, vol. 10, num. 5, p. 1504-1513
20. **[\*]** "Rate-Distortion Curve Evaluation for Cross-Layer Optimization in Progressive Video Transmission"  
**L. Toni**  
**2010.** Journal of next Generation Information Technology, vol. 18, num. 11, p. 2476-2490
21. **[\*]** "Channel Coding for Progressive Images in a 2-D Time-Frequency OFDM Block With Channel Estimation Errors"  
**L. Toni**, Y. S. Chan, P. Cosman and L. Milstein  
**2009.** IEEE Transactions on Image Processing, vol. 18, num. 11, p. 2476-2490

## Pre-Prints

- **[\*\*]** "Graph signal processing for machine learning: A review and new perspectives"  
X. Dong, D. Thanou, **L. Toni**, M. Bronstein, and P. Frossard  
**2020.** IEEE Signal Processing Magazine, Special Issue on "Graph Signal Processing: Foundations and Emerging Directions" (under revision, 2nd revision process).
- **[\*\*]** State2vec: Off-Policy Successor Features Approximators  
S Madjiheurem, **L Toni**  
**2020.** arXiv preprint arXiv:1910.10277
- "Online Network Process Learning with Spectral Bandit"  
**L. Toni** and P. Frossard  
**2019.** (submitted to IEEE Transaction on Signal Processing).
- **[\*\*]** Error Analysis on Graph Laplacian Regularized Estimator  
K Yang, X Dong, **L Toni**  
**2019.** arXiv preprint arXiv:1902.03720

## Invited Journals

- "Video-aware Wireless Networks: Caching and cross-layer design for enhanced video performance"  
H. Ahlehagh, **L. Toni**, D. Wang, P. Cosman, S. Dey, L. Milstein,  
**2015.** Intel Technology Journal, Volume 19, Issue 1
- "Cross-Layer Design for Mobile Video Transmission"  
**L. Toni**, D. Wang, P. Cosman and L. Milstein  
**2013.** IEEE E-Letter of Multimedia Communications Technical Committee (MMTC), Vol.8, No.5
- "MSE cross-layer optimization criteria: What else?"  
**L. Toni**, P. Frossard,  
**2011.** IEEE E-Letter of Multimedia Communications Technical Committee (MMTC), Vol. 6.

## Peer-reviewed Conferences

[\*] As presenter (*relatore a congressi e convegni*)

[\*\*] As senior author

1. [\*\*] "Laplacian-regularized graph bandits: Algorithms and theoretical analysis"  
K. Yang, X. Dong, and **L. Toni**  
**2020**. AISTATS, Virtual conference
2. [\*\*] "Understanding User Navigation in Immersive Experience: an Information-Theoretic analysis"  
S. Rossi, and **L. Toni**  
**2020**. MMVE Workshop – MMSys, Virtual conference
3. [\*\*] "Representation Learning on Graphs: A Reinforcement Learning Application"  
S. Madjiheurem, **L. Toni**  
**2019**. AISTATS, Okinawa, Japan
4. [\*\*] "Streaming From a Moving Platform with Real-Time and Playback Distortion Constraints"  
G. Cocco and **L. Toni**  
**2019**. IEEE ICC, Shanghai, China
5. [\*\*] "Spherical clustering of users navigating 360° content"  
S. Rossi, F. De Simone, P. Frossard, and **L. Toni**  
**2019**. IEEE ICASSP, UK
6. [\*\*] "Graph Based Recommendation System"  
K. Yang and **L. Toni**  
**2018**. IEEE GlobalSIP'18, Anaheim, California
7. [\*] "Spectral MAB for Unknown Graph Processes"  
**L. Toni** and P. Frossard  
**2018**. EUSIPCO, Rome, Italy
8. "Optimization of Joint Progressive Source and Channel Coding for MIMO Systems",  
M. Shin, **L. Toni**, Sang-Hyo Kim and Seok-Ho Chang  
**2017**. IEEE Globecom, Singapore
9. [\*\*] "Navigation-Aware Adaptive Streaming Strategies for Omnidirectional Video",  
S. Rossi and **L. Toni**  
**2017**. IEEE MMSP, Luton, UK
10. "Finite Length Performance of Random Slotted ALOHA Strategies"  
K. Dovelos, **L. Toni**, P. Frossard  
**2017**. IEEE ICC, Paris, France
11. "Optimized receiver control in Interactive Multi-View Video Streaming Systems"  
X. Zhang, **L. Toni**, P. Frossard and Y. Zhao  
**2017**. IEEE ICC, Paris, France
12. "Price-based Controller for Quality-Fair HTTP Adaptive Streaming"

S. D'Aronco, **L. Toni** and P. Frossard

**2016.** IEEE ISM, San Jose, CA, USA (**Best Paper Award**)

13. "Complexity Constrained Representation Selection for Dynamic Adaptive Streaming"  
C. Li, **L. Toni**, P. Frossard, H. Xiong and J. Zou  
**2016.** IEEE VCIP, Chengdu, China (**Top 10% Paper Award**)
14. "A Comparative Study of DASH Representation Sets Using Real User Characteristics"  
C. Kreuzberger, B. Rainer, H. Hellwacher, **L. Toni** and P. Frossard  
**2016.** ACM NOSSDAV, Klagenfurt, Austria
15. [\*] "Online Learning Adaptation Strategy for DASH Clients"  
F. Chiariotti, S. D'Aronco, **L. Toni** and P. Frossard  
**2016.** ACM MMSys, Klagenfurt, Austria
16. [\*] "In-Network View Re-Sampling for Interactive Free Viewpoint Video Streaming"  
**L. Toni**, G. Cheung and P. Frossard  
**2015.** IEEE ICIP, Quebec City, Canada
17. "Multiview Video Representations for Quality-Scalable Navigation"  
K. De Abreu Goes, **L. Toni**, T. Maugey, N. Thomon, P. Frossard, and F. Pereira  
**2014.** IEEE VCIP, Valetta, Malta
18. [\*] "Packet Scheduling in Multicamera Capture Systems"  
**L. Toni**, T. Maugey and P. Frossard  
**2014.** IEEE VCIP, Valetta, Malta
19. [\*] "Optimal Set of Video Representations in Adaptive Streaming"  
**L. Toni**, R. Aparicio-Pardo, G. Simon, A. Blanc and P. Frossard  
**2014.** ACM Multimedia Systems, Singapore
20. "Device-to-Device Assisted Video Transmission"  
Y. Shen, W. Zhou, P. Wu, **L. Toni** and P. Cosman et L. Milstein  
**2013.** Packet Video Workshop, San Jose, CA
21. [\*] "Interactive Free Viewpoint Video Streaming Using Prioritized Network Coding"  
**L. Toni**, N. Thomos and P. Frossard,  
**2013.** IEEE MMSP, Pula (Sardinia), Italy. (**Top 10% Paper Award**)
22. [\*] "Correlation-aware packet scheduling for multi-camera streaming"  
**L. Toni**, T. Maugey and P. Frossard  
**2012.** Packet Video Workshop, Munich, Germany
23. [\*] "Packet Error Recovery in Multipath Underwater Networks using Reed-Solomon Codes"  
E. Cherkaoui, S. Azad, P. Casari, **L. Toni**, N. Agoulmine and M. Zorzi  
**2012.** MTS/IEEE Oceans '12, Hampton Roads, Virginia
24. [\*] "Subcarrier Mapping Based on Slice Visibility for Video Transmission over OFDM Channels"  
**L. Toni**, P. C. Cosman, and L. B. Milstein

**2012.** Asilomar Conference on Signals, Systems, and Computers, PACIFIC GROVE, CA

25. "A Study on the SPIHT Image Coding Technique for Underwater Acoustic Communications"  
B. Tomasi, **L. Toni**, P. Casari, J. Preisig, and M. Zorzi  
**2012.** ACM international Workshop on UnderWater Networks (WUWNET '11), Seattle
26. **[\*\*]** "Analyzing the Performances of a target detection algorithm in Underwater Sensor Network with Aqua-Sim"  
L. Sorbi, G. De Capua, E. Cherkaoui, **L.Toni**  
**2011.** IEEE/IFIP UUWSN '11, Melbourne, Australia
27. "Target detection and recognition: a mission planner for Autonomous Underwater Vehicles"  
L. Sorbi, G. De Capua, **L. Toni**, J-G. Fontaine,  
**2011.** MTS/IEEE OCEANS '11, Kona, Hawaii
26. **[\*]** "Threshold Evaluation in Link Adaptation Schemes for Progressive Images Transmission"  
**L. Toni**, and B. Masini,  
**2011.** IEEE VTC11-Fall, San Francisco, CA
27. **[\*]** "Unequal error protection based on slice visibility for transmission of compressed video over OFDM channels"  
**L. Toni**, P.C. Cosman, and L. Milstein,  
**2011.** ICME, Barcelona (Spain)
28. "On the Effects of Node Mobility on Energy Efficiency and Delay Sensitive Applications in Underwater Sensor Network",  
E. H. Cherkaoui, **L. Toni**, N. Agoulmine, and J.-G. Fontaine  
**2011**, IEEE Oceans MTS, SANTANDER (Spain), 2011.
29. "Behavior-Based control: an approach to cooperative AUVs missions"  
L. Sorbi, G. P. De Capua, **L. Toni**, J-G Fontaine, and L. Rossi,  
**2011.** IASTED International Conference on Robotics and Applications (RA '11), Vancouver, Canada
30. **[\*]** "Joint Source Channel Coding Optimization for Heterogeneous Access Networks in Multiuser Scenario"  
**L. Toni**, L. Rossi, N. Agoulmine, and J-G. Fontaine  
**2011.** IFIP/IEEE IM, Dublin, Ireland, 2011.
31. "Taking Advantage of The Diversity in Wireless Access Networks: On the Simulation of a User Centric Approach"  
E. Cherkaoui, N. Agoulmine, T. Nguyen, **L. Toni** and J.-G. Fontaine  
**2011.** IFIP/IEEE IM, Dublin, Ireland, 2011.
32. "Communication in a behavior-based approach to target detection and tracking with Autonomous Underwater Vehicles"  
L. Sorbi, **L. Toni**, G. De Capua, L. Rossi  
**2010.** IEEE/IFIP UUWSN '10, Hong Kong (China) (Best Paper Award)

33. "Performance Study of Variable-Rate Modulation for Underwater Communications based on Experimental Data"  
B. Tomasi, **L. Toni**, P. Casari, L. Rossi, M. Zorzi  
**2010**. IEEE Oceans MTS '10, Seattle (Washington)
34. "Virtual UEP in Underwater Image Transmission"  
**L. Toni**, L. Rossi, N. Agoulmine, and J.-G. Fontaine,  
**2010**. IEEE Oceans, Sydney (Australia)
35. "Source Coding Optimization for Heterogeneous Access Networks"  
L. Rossi, **L. Toni**, N. Agoulmine, and J.-G. Fontaine,  
**2010**. IEEE/IFIP NOMS, Osaka, Japan
36. **[\*]** "Adaptive Modulation Systems Subject to Interference"  
**L. Toni**, A. Conti, M. Chiani, and O. Andrisano,  
**2010**. IEEE WSR '10, Karlsruhe Institute of Technology (KIT) Germany
37. **[\*]** "Effective Spectral Efficiency for Adaptive QAM with Diversity and Pilot Assisted Channel Estimation"  
**L. Toni**, A. Conti, F. Zabini, and O. Andrisano,  
**2009**. IEEE ISWCS, Siena, Italy

# Teaching Experience

I have organised and taught on several undergraduate and MSc courses at the University of Bologna, EPFL, and UCL including digital communications, image communications, signal processing and advanced signal processing for machine learning, and connected systems.

I am one of the three **co-founders of the new MSc programme in Integrated Machine Learning Systems** (started on September 2019) at UCL. I am also involved in CPD (continuing professional development) courses on machine learning for industries. I'm the course director of the MSc programs on Telecommunications and Internet Engineer and the MRes program on Telecommunications.

## Administrative Roles

### Institutional Responsibilities:

- Co-founder (1 of the 3 academics involved) of the new MSc programme in *Integrated Machine Learning Systems* (starting on September 2019), **UCL** (*creazione di un nuovo corso magistrale*)
- Director of the MSc programme in *Telecommunications* (September 2019-present), **UCL**
- Director of the MSc programme in *Internet Engineering* (September 2019-present), **UCL**
- Director of the MRes programme in *Telecommunications* (September 2019-present), **UCL**
- Academic tutor for 1<sup>st</sup> year students, (2016/2017), **UCL**
- Academic tutor for 1<sup>st</sup> year students, (2018/2019), **UCL**
- Academic tutor for 1<sup>st</sup> year students, (2019/2020), **UCL**

### Proposal/Scholarships Committee:

- Engineering Summer Bursaries, Selection Panel, 2017, **UCL**
- GRS/ORS/CSC-UCL Scholarship, Selection Panel, 2020, **UCL**

### PhD Thesis Committee

- DCIS Committee for PhD Exams – Rennes – May 2017
- Engineering Summer Bursaries 2017 – Selection Panel
- PhD Examiner
  - Mira RIZKALLAH (Supervisor Christine Guillemot), INRIA-Universite' de Rennes, April 2019.
  - Xavier Corbillon (Supervisor Gwendal Simon), IMT Atlantique, October 2018
  - Pingfan Song (Supervisor Miguel Rodrigues), UCL, September 2018
  - Alhabib Abbas (Supervisor Yiannis Andreopoulos), UCL, December 2019
- Transfer Upgrade Thesis and Viva
  - Jifang Duan Supervisor David Selviah) – March 2017
  - Mahmoud Tukur (supervisor Christos Masouros) – June 2017
  - Nafiseh Vahabi (Supervisor David Selviah) – September 2017
  - Afroditi Papadaki (Supervisor Miguel Rodrigues) – January 2020
  - Victor Darvariu (Supervisor Mirco Musolesi) – Marc 2020
  - Andrea Piccione (Supervisor Yiannis Andreopoulos) – April 2020
- MSc Examiner
  - Cecilia Manzoni, EPFL, June 2017
  - UCL MSc final report examination, 2017-present

## Lectures (*Lezioni frontali*)

[\*] As module leader

### Undergraduate Degree

- [\*] **Winter Term 2020**: module leader for “Connected Systems C”, 3<sup>rd</sup> year, **UCL**.
- [\*] **Winter Term 2021/20**: module leader for “Connected Systems C”, 3<sup>rd</sup> year, **UCL**.
- **Fall Term 2020**: teaching *Wireless Technologies* for “Connected Systems A” led by Prof.

John Mitchell, 2<sup>nd</sup> year, **UCL**.

- **Fall Term 2019:** teaching *Wireless Technologies* for “Connected Systems A” led by Prof. John Mitchell, 2<sup>nd</sup> year, **UCL**.
- **Fall Term 2018:** teaching *Wireless Technologies* for “Connected Systems A” led by Prof. John Mitchell, 2<sup>nd</sup> year, **UCL**.
- **Fall Term 2019:** teaching *MAC Techniques* for ELEC310P “Connected Systems B” led by Dr. Ryan Grammenos, 3<sup>rd</sup> year, **UCL**.
- **Fall Term 2018:** teaching *MAC Techniques* for ELEC310P “Connected Systems B” led by Dr. Ryan Grammenos, 3<sup>rd</sup> year, **UCL**.
- **Fall Term 2019:** teaching *MAC Techniques* for ELEC310P “Connected Systems B” led by Dr. Ryan Grammenos, 3<sup>rd</sup> year, **UCL**.
- **Spring Term 2008:** teaching assistant for the course of “Signal Processing” held by Prof. Davide Dardari, 3<sup>rd</sup> year, **University of Bologna**.

### MSc Degree

- **[\*] Fall Term 2019:** module leader and module creator of “Data Acquisition and Processing Systems”, **UCL**.
- **Winter Term 2018:** teaching *MAC Techniques* for the master module of “Wireless Communication Principles” led by Dr. Miguel Rodrigues, **UCL**.
- **Winter Term 2017:** teaching *MAC Techniques* for the master module of “Wireless Communication Principles” led by Dr. Miguel Rodrigues, **UCL**.
- **Winter Term 2016:** teaching *MAC Techniques* for the master module of “Wireless Communication Principles” led by Dr. Miguel Rodrigues, **UCL**.
- **Fall Term 2019:** teaching *Multimedia coding* for the master module of “Introduction to Telecommunication Networks” held by Prof. Izzat Darwazeh, **UCL**.
- **Fall Term 2019:** teaching *Source and Channel coding* for the master module of “Mobile Communication System” led by Prof. Izzat Darwazeh, **UCL**.
- **Fall Term 2018:** teaching *Source and Channel coding* for the master module of “Mobile Communication System” led by Prof. Izzat Darwazeh, **UCL**.
- **Fall Term 2017:** teaching *Source and Channel coding* for the master module of “Mobile Communication System” led by Prof. Izzat Darwazeh, **UCL**.
- **Fall Term 2016:** teaching *Source and Channel coding* for the master module of “Mobile Communication System” led by Prof. Izzat Darwazeh, **UCL**.
- **Spring Term 2015:** teaching assistant for the course of “Image Communications” held by Prof. Pascal Frossard, **EPFL**.
- **Spring Term 2013:** teaching assistant for the course of “Image Communications” held by Prof. Pascal Frossard, **EPFL**.
- **Winter Term 2009:** teaching assistant for the course of “Fundamental of Communication Systems” held by Prof. Oreste Andrisano, **University of Bologna**.

### Seminars, Tutorials, and Lectures

- **Summer School** on “ITN summer school on ML for comms”, @UCL (virtual), June 2020, UK.



## Consultancy (*Lezioni per consulenza*)

### CDP (continuing professional development)

- 5-days course (for engineers) on Machine Learning delivered to DSTL - Defence Science and Technology Laboratory, (contract for 3 times per year for 3 years), 2019-present
- 1-day course (for team-leaders) on Machine Learning delivered to DSTL (contract for 6 times per year for 3 years), 2019-present
- 1-day course (for executives) on Machine Learning delivered to DSTL (contract for 6 times per year for 3 years), 2019-present
- 1-day course on Machine Learning delivered to MOD – Minister of Defense (contract for 5 times per year) 2019-present

## Training of Laboratory Personnel

### Graduate Students – (*le attività di tutorato di dottorandi di ricerca*)

- **As Advisor:**

- a) **Pedro Gomes, PhD School of Electrical Engineering at UCL (2020 – present)**

- PhD Topic:** “Graph Learning for Volumetric Video Processing”

- b) **Kaige Yang, PhD School of Electrical Engineering at UCL (2018 – present)**

- PhD Topic:** “*Graph-Based Bandits*”

- Scientific outcome:**

- K. Yang, X. Dong, and L.Toni, “Laplacian-regularized graph bandits: Algorithms and theoretical analysis”, AISTATS, 2020.
    - K. Yang and L. Toni, “Graph Based Recommendation System”, IEEE GlobalSIP’18, Anaheim, California, 2018.
    - K Yang, X Dong, L Toni, “Error Analysis on Graph Laplacian Regularized Estimator”, arXiv preprint arXiv:1902.03720, 2019 (Submitted to IEEE Transaction on Signal Processing)
    - K Yang, P. Gaillard, M. Valko, L. Toni, “Fully Adaptive Linear Bandit Algorithm with Optimal Minimax Regret”, submission NeurIPS, 2020.
    - K Yang, L. Toni, “Differentiable Linear Bandit”, submission NeurIPS, 2020.

- c) **Sephora Madjiheurem, PhD School of Electrical Engineering at UCL (2017 – present)**

- Currently on leave being an intern at Google and Deepmind since Aug 2019.

- PhD Topic:** “*Data-Efficient Reinforcement Learning*”

- Scientific outcome:**

- S. Madjiheurem, L. Toni, “Representation Learning on Graphs: A Reinforcement Learning Application”, AISTATS, Okinawa, Japan, 2019.
    - S Madjiheurem, L Toni, “State2vec: Off-Policy Successor Features Approximators”, arXiv preprint arXiv:1910.10277, 2019

**d) Silvia Rossi, PhD School of Electrical Engineering at UCL (2017 – present)**

**PhD Topic:** *“Learning Users Interactivity in VR Systems”*

**Scientific outcome:**

- S. Rossi, C. Ozcinar, A. Smolic, L. Toni, “Do Users Behave Similarly in VR? Investigation of the User Influence on the System Design”, ACM Transactions on Multimedia Computing, Communications, and Applications, <https://doi.org/10.1145/3381846>, 2020.
- S. Rossi, and L. Toni, "Understanding User Navigation in Immersive Experience: an Information-Theoretic analysis", MMVE Workshop – MMSys, 2020.
- S. Rossi, F. De Simone, P. Frossard, and L. Toni, “Spherical clustering of users navigating 360° content”, IEEE ICASSP, UK, 2019
- S. Rossi and L. Toni, "Navigation-Aware Adaptive Streaming Strategies for Omnidirectional Video", IEEE MMSP, Luton, UK, 2017

• **As Co-Advisor:**

**a) Stefano D’Aronco, PhD School of Electrical Engineering at EPFL (2013-2018)**

**Final Dissertation:** *“Network utility maximization for delay-sensitive applications in unknown communication setting”*

**b) Ana De Breu, PhD School of Electrical Engineering at EPFL (2012-2015)**

**Final Dissertation:** *“Optimized Coding Strategies for Interactive Multiview Video”*

**c) ElHadi Charkoui, PhD School of Electrical Engineering at IIT (2013-2018)**

**Final Dissertation:** *“Adaptive Routing and Protocols for Underwater Communications  $g$ ”*

**d) Laura Sorbi, PhD School of Electrical Engineering at IIT (2013-2018)**

**Final Dissertation:** *“Mission Planner for Cooperative Autonomous Underwater Vehicle”*

**Master Student Projects Supervision at UCL (relatore di tesi di laurea magistrale):**

1. Wang Han, “Learning on Graph Representation for Meta Reinforcement Learning”, 2020
2. Xie Zhidian, “Machine Learning for Predicting Users’ Behaviour in Virtual Reality”, 2020
3. Wu Xudong, “Research projects at BBC London”, 2020
4. Guo Hao, “Action elimination in reinforcement learning”, 2020
5. Liao Wenting, "Graph-based Learning for Recommendation System", 2019
6. Luo Jiesi, "Representation Learning on Graphs", 2019
7. Meng Hao, "Influence Maximization in Social Networks", 2019
8. Shi Jiahao, "Graph Based Learning for Drug Design", 2019
9. Liu Weiqiu, “Adaptive Streaming over HTTP platform implementation”, 2018
10. Wang Zhao, “Graph-based Learning for Recommendation Systems”, 2018
11. Xie Ximing, “Geometric Deep Neural Network”, 2018
12. Chen Xuan, “Predicting Users Behavior in Virtual Reality”, 2018
13. Yan Yi, “Predicting Users’ Behaviour in Virtual Reality”, 2017
14. Kaige Yang, “Graph-based Learning for Recommendation Systems”, 2017

**Unergrad Student Projects Supervision (tirocinio):**

1. Vincent Tan, 3rd year project, 2020

2. Sultan Kenjeiev, 3rd year project, 2020
3. Candice Hughes, 3rd year project, 2019
4. Dhaval Vyas, 3rd year project, 2019
5. Myles Foley, 3rd year project, 2019
6. Zhidian Xie, 3rd year project, 2019
7. Jiaojiao Ma, 4th year project, 2019
8. Chenchao Li, 4th year project, 2019
9. Zi Wang, 4th year project, 2019
10. Hening Zhang, 4th year project, 2019

Data

20 May 2020

Luogo

San Lazzaro di Savena (BO)