

Arthur Minakhmetov

Ph.D. in Networks, Information and Communications, Télécom Paris

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RESEARCH INTERESTS

My research focuses on networks management and their performance. In particular, it includes fast switching optical networks and applied to them congestion control algorithms, wireless and optical access networks convergence, and investigation of ways to improve the Quality of Transmission (QoT) in optical links.

EDUCATION

- **Télécom Paris, Institut Polytechnique de Paris** Palaiseau, France
Ph.D. Candidate, Networks, Information and Communications 2016 – 2019
 - Thesis : Cross-layer Hybrid and Optical Packet Switching
 - Advisor : Associate Prof. Cédric Ware
 - Co-advisor : Associate Prof. Luigi Iannone
- **Université Paris-Saclay** Palaiseau, France
M.Sc. “Networks Optics & Photonic Systems” 2016
 - Thesis : Study of the coding for the compensation of nonlinear effects
 - Advisor : Research Engineer Patricia Layec
- **Institut d’Optique Graduate School (École supérieure d’optique)** Palaiseau, France
Engineering degree in Applied and Theoretical Optics, equivalent to M.Sc. 2014 – 2016
- **Bauman Moscow State Technical University** Moscow, Russia
Diplomas of Bachelor’s and Master’s degrees in laser techniques and technology 2008 – 2014

RESEARCH AND PROFESSIONAL EXPERIENCE

- **Alcatel Submarine Networks** Nozay, France
WDM terrestrial optical network engineer 06.2020 – currently
- **Information Processing and Communication Laboratory, Télécom-Paris** Palaiseau, France
PhD candidate with doctoral contract 10.2016 – 12.2019
 - Investigation of the performance of Optical Packet Switched (OPS) networks under all-optical and hybrid switches, while server side transmission activities are regulated by Transport Control Protocols (TCP) based on Congestion Control Algorithms (TCP CCAs). We consider that OPS could be enabled by use of hybrid switch, i.e. all-optical switch equipped with electronic buffer, creating Hybrid OPS (HOPS); as well as by use of tailored TCP CCAs. Taking a cross-layer approach in network design we propose solutions for Data Center Networks (DCN) that is based on joint action of hybrid switches and TCP CCAs.
 - Developed an event-based network simulator, that can simulate whole OPS, HOPS, conventional Electronic Packet Switching (EPS) networks, taking into account TCP emulation. One can simulate transmission activities in networks of arbitrary topology, with custom switching rules on routers, taking or not into account Wavelength Division Multiplexing (WDM), implementing arbitrary TCP CCAs.
 - Proposed new TCP CCA adapted for use in DCN on HOPS: TCP Stop-And-Wait-Longer (SAWL)
 - Discovered that HOPS on TCP SAWL in DCN can show 3 times better latencies, and 4 times less energy consumption (due to Optical-Electronic-Optical (OEO) conversion reduction), while having same order of throughput than conventional DCN technologies.
- **Columbia University** New York, USA
Visiting scholar 03.2019 – 06.2019
 - Investigation and research on SDN controlled optical networks for 5G applications. Proposed a scheme of reconfigured networks with dynamic capacity allocation for converged wireless/optical networks. Contributed to construction and implementation of COSMOS test-bed. Conducted experiments on COSMOS test-bed.
- **Nokia, Bell Labs** Nozay, France
Research Intern 03.2016 – 08.2016
 - Mitigation of non-linear effects in optical fibers for telecommunications. Study of Cross-Polarization Modulation (XPoLM) creating transmission impairments in optical links. Proposed solutions to mitigate influence of XPoLM through joint use of space-time codes and Error Correcting Codes (ECC).
- **LiquidInSpect Solutions** Paris, France
Technical and Management role 03.2018 – 03.2018

- Organized and supervised wine spectra analysis project applying data science methods. LiquidInSpect – a spin-off of the IRwine project.

- **IRwine** Paris, France
Chief Technical Officer role 02.2016 – 02.2018
 - Conducted a study on wine quality control by the means of optical spectroscopy in Visible and Near Infrared (VIS/NIR) wavelength domain. Developed a prototype solution. Organized a research lab, supervised experiments and results analysis. IRwine is French Tech Ticket Season 2 winner, procuring €50,000 of funding; our team worked on innovation development and wine market analysis.
- **Independent R&D consultant-engineer** Palaiseau, France
R&D engineer 11.2015 – 03.2016
 - Design of optical systems for imaging in the THz domain. Developed scanning and imaging optical systems.
- **T-Waves Technologies** Montpellier, France
Engineering intern 05.2015 – 08.2015
 - Design of optical systems for imaging in the THz domain. Invented a new type of optical systems for line-scanning, machine-vision systems working in THz domain.
- **Deloitte & Touche** Moscow, Russia
Consulting in a financial sector, implementation of enterprise applications for finance. 08.2012 – 08.2014

HONORS & AWARDS

- **Institute Mines-Télécom/Columbia University COMITI grant** 2019
€5,000 grant awarded to undertake 4 month research scholar visit to Columbia University
- **Doctoral School STIC, Université Paris Saclay, Mobility grant** 2019
€500 grant awarded to undertake 4 month research scholar visit to Columbia University
- **Doctoral School STIC, Université Paris Saclay, Summer School Funding** 2018
Grant awarded to participate in EPSRC Summer School of Photonics, University of St. Andrews
- **Heriot-Watt University, Summer School Bursary** 2018
Grant awarded to participate in EPSRC Summer School of Photonics, University of St. Andrews
- **3rd place in the Doctors-Entrepreneurs Contest** 2017
Awarded €1,000 for the project on vine quality evaluation
- **French Tech Ticket Grant** 2017
Awarded €50,000 funding to develop solution to evaluate vine quality by means of optical spectroscopy
- **3rd place in the Falling Walls Lab Paris Contest** 2016
Awarded for the project on vine quality evaluation
- **French Government Scholarship** 2014 – 2015
Personal “full-ride” scholarship is awarded to undertake Master’s level studies at Institut d’Optique Graduate School

PUBLICATIONS

Conference Proceedings

- **A. Minakhmetov**, C. Gutterman, T. Chen, J. Yu, C. Ware, L. Iannone, D. Kilper, and G. Zussman, “Experiments on Cloud-RAN wireless handover using optical switching in a dense urban testbed,” in *Proc. of the IEEE/OSA Optical Fiber Communication Conference (OFC)*, no. Th2A.25 (to appear), San Diego, USA: Mar. 2020.
- J. Yu, C. Gutterman, **A. Minakhmetov**, M. Sherman, T. Chen, S. Zhu, G. Zussman, I. Seskar, and D. Kilper, “Dual use SDN controller for management and experimentation in a field deployed testbed,” in *Proc. of the IEEE/OSA Optical Fiber Communication Conference (OFC)*, no. T3J.3 (to appear), San Diego, USA: Mar. 2020.
- **A. Minakhmetov**, C. Ware and L. Iannone. “Data Center’s Energy Savings for Data Transport via TCP on Hybrid Optoelectronic Switches,,” in *Proc. of the IEEE Photonics Conference (IPC)*, no. TuC3.3, San Antonio, USA, Oct. 2019.
- **A. Minakhmetov**, C. Ware and L. Iannone. “Hybrid and Optical Packet Switching Supporting Different Service Classes in Data Center Network,” in *Proc. of the IFIP 23rd Conference on Optical Network Design and Modelling (ONDM)*, Athens, Greece, May. 2019.

- **A. Minakhmetov**, A. Nagarajan, L. Iannone and C. Ware. “On the Latencies in a Hybrid Optical Packet Switching Network in Data Center,” in *Proc. of the IEEE/OSA Optical Fiber Communication Conference (OFC)*, no. W2A.21, San Diego, USA, Mar. 2019.
- **A. Minakhmetov**, H. Chouman, L. Iannone, M.Lourdiane and C. Ware, “Network-level strategies for best use of optical functionalities,” in *Proc. of the IEEE Int. Conf. on Transparent Optical Networks (ICTON)*, no. Tu.B1.3, Bucharest, Romania: IEEE, Jul. 2018, [invited paper](#).
- **A. Minakhmetov**, C. Ware, and L. Iannone. “Amélioration du débit des réseaux optiques via TCP Stop-and-Wait sur les commutateurs hybrides,” in *Proc. of the ALGOTEL 2018*, May 2018, Roscoff, France.
- **A. Minakhmetov**, C. Ware, and L. Iannone, “Optical Networks Throughput Enhancement via TCP Stop-and-Wait on Hybrid Switches,” in *Proc. of the IEEE/OSA Optical Fiber Communication Conference (OFC)*, no. W4I.4, San Diego, USA: Mar. 2018.

Journals

- **A. Minakhmetov**, C. Ware and L. Iannone, “Hybrid and optical packet switching supporting different service classes in data center network,” in *Springer’s Photonic Network Communications*, 10 July, 2020, doi: 10.1007/s11107-020-00894-9
- **A. Minakhmetov**, C. Ware and L. Iannone. “Data Center’s Energy Savings for Data Transport via TCP on Hybrid Optoelectronic Switches,” in *IEEE Photonics Technology Letters*, Volume: 31 , Issue: 8 , Apr. 2019.
- **A. Minakhmetov**, C. Ware, and L. Iannone, “TCP Congestion Control in Datacenter Optical Packet Networks on Hybrid Switches,” *IEEE/OSA J. Opt. Commun. Netw. (JOCN)*, vol. 10, no. 7, pp. B71–B81, Jul. 2018.

Patents

- C. Archier, B. Moulin and **A. Minakhmetov** “Imaging Device with Multipixel Sensor for Constituting an Image with Terahertz Radiation,” French Patent Bureau, FR3069372, 2019-01-25

Workshops Proceedings

- C. Gutterman, **A. Minakhmetov**, J. Yu, M. Sherman, T. Chen, S. Zhu, I. Seskar, D. Raychaudhuri, D. Kilper and G. Zussman, “Programmable Optical x-Haul Network in the COSMOS Testbed,” in *Proc. of the The 27th IEEE International Conference on Network Protocols (ICNP), MERIT workshop*, Chicago, US, Oct. 2019
- C. Gutterman, **A. Minakhmetov**, M. Sherman, J. Yu, T. Chen, S. Zhu, G. Zussman, I. Seskar, D. Raychaudhuri and D. Kilper, “COSMOS: optical architecture and prototyping,” in *Proc. of the ACM SIGCOMM 2019 Workshop on Optical Systems Design, “OptSys ’19”*, Beijing, China, Aug. , 2019

MENTORING AND ADVISING

Master Students

Horacio Tavarez (Fall 2018, RO SP Master’s Program)
 Duc Trung Duong (Fall 2018, RO SP Master’s Program)
 Ruoying Li (Fall 2018, RO SP Master’s Program)
 Runze Yin (Fall 2018, RO SP Master’s Program)
 Sterenn Guerrier (Fall 2017, RO SP Master’s Program)
 Guillaume Raynal (Fall 2017, RO SP Master’s Program)

Undergraduate Students

Archana Nagarajan (Summer 2018 Internship, currently a M.S. student at University of California, Los Angeles)

TEACHING EXPERIENCE

- **Télécom Paris** Paris, France
Teaching Assistant 2016 – 2018
 - **COM 103** (Fall 2018) Antennas and Propagation: labworks Diffraction
 - **RO SP 901** (Fall 2018) Components: labworks on Laser Diode Operation
 - **SOCOM 206** (Winter 2018) Communication systems: labworks on Laser Diode Operation
 - **COM 101** (Fall 2017, Fall 2018) Optics and Photonics: labworks on Optical Anisotropy, Diffraction
 - **TPT 07** (Fall 2016, Fall 2017) Optical Communications: labworks on Optical Fiber Transmissions, Optical Time Domain Reflectometry, Laser Diode Operation
 - **RES 101** (Spring 2017) Networks: labworks on Basics of TCP/IP Networks

TECHNICAL SKILLS

- **Programming Languages:** C++, Python, Delphi
- **Scientific calculation:** MATLAB, MathCAD
- **Optical systems design:** ZEMAX, OSLO
- **CAD 3D:** AutoCAD, Compas 3D

LANGUAGES

- **English:** fluent, TOEIC 980/990; **French:** fluent; **Russian:** fluent

HOBBIES

- Music, Classical music, cinema, TV series, sports – skiing, surfing, swimming.