

# Nicolas Loizou

## Contact Details

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## Fields of Interests

Large Scale Optimization, Machine Learning, Convex and Non-Convex Analysis, Randomized Algorithms, Randomized Numerical Linear Algebra, Data Science

## Education

**University of Edinburgh, School of Mathematics**  
**PhD in Operational Research and Optimization, 2015 - present**  
*Supervisors:* Dr. Peter Richtarik and Dr. Ilias Diakonikolas

**Imperial College London**  
**MSc in Computing (Computational Management Science), 2014-2015**  
*MSc Thesis:* "Distributionally Robust Game Theory" with Distinction 83%  
*Supervisors:* Dr. Wolfram Wiesemann and Dr. Panos Parpas

**National and Kapodistrian University of Athens**  
**BSc Mathematics, 2010- 2014**  
Final overall average 8.79/10 (upper 1 % of 350 graduating students).  
*Specialization:* Applied Mathematics (Statistics and Operational Research).

## Publications

N. Loizou, P. Richtárik. **Inexact and adaptive sample size randomized iterative methods for large linear systems**, (in progress)

N. Loizou, P. Richtárik. **Revisit the foundations of randomized gossip algorithms: Complexity, duality, novel block and accelerated protocols**. (in progress)

N. Loizou, P. Richtárik. **Momentum and Stochastic Momentum for Stochastic Gradient, Newton, Proximal Point and Subspace Descent Methods** arXiv preprint arXiv:1712.09677, 2017 (submitted)

N. Loizou, P. Richtárik. **Linearly convergent stochastic heavy ball method for minimizing generalization error**, NIPS Workshop on Optimization for Machine Learning, 2017

F. Hanzely, J. Konečný, N. Loizou, P. Richtárik, D. Grishchenko **Privacy Preserving Randomized Gossip Algorithms** arXiv preprint arXiv:1706.07636, 2017, (submitted)

N. Loizou, P. Richtárik. **A New Perspective on Randomized Gossip Algorithms**, IEEE Global Conference on Signal and Information Processing (GlobalSIP), pp.440-444, 2016

N. Loizou : **Distributionally Robust Games with Risk-Averse Players**, In Proceedings of 5th International Conference on Operations Research and Enterprise Systems, 186-196, 2016

## Presentations (Upcoming and Past)

### *Talks*

- 5-8 Feb 2018, **Optimization and Big Data 2018**, KAUST, Thuwal, Saudi Arabia,  
talk: "Momentum and Stochastic Momentum for Stochastic Gradient, Newton, Proximal Point and Subspace Descent Methods"
- 5 Oct 2017, **RISELab, Department of Computer Science, UC Berkeley**, California, USA  
talk: "Stochastic and Doubly Stochastic Dual Heavy Ball Methods for Quadratic Optimization with Low-Rank Hessian"
- 31 May 2017, **Conference on Computational Management Science**, Bergamo, Italy, (invited)  
talk: "Distributionally Robust Games with Risk-Averse Players "
- 22 May 2017, **SIAM Conference on Optimization**, Vancouver, British Columbia, Canada (invited)  
talk: "Stochastic Heavy Ball Method for Solving Linear Systems"
- 9 Dec 2016, **IEEE Global Conference on Signal and Information Processing (GlobalSIP)**, Washington D.C, USA  
talk: "A new Perspective on Randomized Gossip Algorithms"
- 7 Sept 2016, **5th IMA Conference on Numerical Linear Algebra and Optimisation**, Birmingham, UK, (organizer of 2 mini-symposia)  
talk: "Randomized Gossip Algorithms: Complexity, Duality and New Variants"
- 1 Aug 2016, **Young Researchers in Mathematics Conference (YRM)**, Saint Andrews, UK  
talk: "A new Perspective on Randomized Gossip Algorithms"
- 23 Feb 2016: **5th International Conference on Operational Research and Enterprise Systems (ICORES)**, Rome Italy  
talk: "Distributionally Robust Games with Risk Averse Players"

### *Posters*

- 8 Dec 2017, **NIPS Workshop on Optimization for Machine Learning**, Los Angeles, USA  
talk: "Linearly convergent stochastic heavy ball method for minimizing generalization error"
- 12 April 2017, **KAUST Research Conference 2017: Visual Computing - Modeling and Reconstruction**, KAUST, Saudi Arabia  
poster: "A New Perspective on Randomized Gossip Algorithm"
- 12 Jan 2017, **SIAM UKIE Annual Meeting 2017**, Glasgow, UK  
poster: "Randomized Gossip Algorithms: Complexity, Duality and New Variants"

- 12 Oct 2016, **Data Science Research Day 2016**, Edinburgh, UK  
poster: "Randomized Gossip Algorithms: Complexity, Duality and New Variants"
- 26 May 2016, **3DT and Friends Student Conference**, Edinburgh, UK  
poster: "Randomized Gossip Algorithms: New Insights"
- 16 May 2016, **Machine Learning Summer School (MLSS)**, Cádiz, Spain  
poster: "Randomized Gossip Algorithms: New Insights"

### *Talks at Local Events*

#### **All Hands Meetings on Big Data Optimization (Edinburgh)** (organizer)

2017: 21 Feb

2016: 2 Feb , 22 Mar, 11 Oct

2015: 3 Nov

### **Research Visits:**

- 11–31 Mar 2018, *Optimization and Machine Learning Research Group, Lehigh University* (Dr. Martin Takac)
- 15 Mar – 5 May 2017, *Visual Computing Center, KAUST, Thuwal, KSA* (Dr. Peter Richtarik)
- 20–30 of July 2016, *Machine Learning and Optimization Group, Microsoft Research, Seattle, USA*. (Dr. Lin Xiao)

### **Achievements, Awards and Scholarships**

- **2017:**
  - **Grant, Edinburgh Research and Development Fund** (cover my expenses for the attendance of Conference on Computational Management Science, Bergamo Italy)
  - Travel award from **Laura Wisewell Travel Fund** for attending SIAM Conference on Optimization
  - **SIAM Student Travel Award** for attending SIAM Conference on Optimization
- **2016:**
  - **IEEE Signal Processing Society Travel Grant** for attending GlobalSip
  - **PCMI Scholarship**. Cover almost all of my expenses for the attendance of the PCMI Summer School in Utah "Mathematics of Data"
  - Scholarship from the **A.G. Leventis Foundation** for PhD studies at University of Edinburgh (2016–2017)
  - **Grant, Edinburgh Research and Development Fund** (cover my expenses for the attendance of Machine Learning Summer School in Cadiz, Spain)
  - **ICORES Travel Award**
- **2015:**
  - Travel award from **Laura Wisewell Travel Fund** for attending International Conference on Operations Research and Enterprise Systems in Rome

- Scholarship from **A.G. Leventis Foundation** for PhD studies at University of Edinburgh (2015-2016)
- **Principal's Career Development Scholarship**: Highly competitive PhD scholarship awarded to several students across University of Edinburgh
- **2014:**
  - **MSc Full Scholarship from Imperial College London Department of Computing** (Scholarships are awarded on academic merit to outstanding applicants.)
  - Scholarship from **A.G. Leventis Foundation** for MSc studies at Imperial College (2014-2015)
- **Before 2014:**
  - Student with Higher grades and specialization in Statistics and Operations Research (National and Kapodistrian University of Athens)
  - Awards for academic excellence in years 2002-2008
  - Prizes for the achievement of the best grades in mathematics in the third grade of Lyceum. 2008

## Attendance at Workshops, Seminars and Conferences

- 4–9 Dec 2017, **Neural Information Processing Systems(NIPS)**, Long Beach, California, USA
- 2–6 Oct 2017, **Fast Iterative Methods in Optimization**, Simons Institute for the Theory of Computing, Berkeley, USA
- 30 May – 1 Jun 2017, **Conference on Computational Management Science**, Bergamo, Italy,
- 22–25 May 2017, **SIAM Conference on Optimization**, Vancouver, British Columbia, Canada
- 12 Apr 2017, **KAUST Research Conference 2017: Visual Computing - Modeling and Reconstruction**, KAUST, Saudi Arabia
- 12 Jan 2017, **SIAM UKIE Annual Meeting 2017**, Glasgow, UK
- 7–9 Dec 2016, **IEEE Global Conference on Signal and Information Processing (GlobalSIP)**, Washington D.C, USA
- 31 Aug – 1 Sept 2016, **Workshop on Computational Statistics and Machine Learning**, Edinburgh, UK
- 27 Jul 2016, **Microsoft Research Theory Group Seminar**, Seattle, USA
- 17 Jun 2016, **Computational Optimization in Action**, ICMS workshop, Edinburgh, UK
- 24–26 Feb 2016, **8th International Conference on Agents and Artificial Intelligence (ICAART)**, Rome, Italy
- 24–26 Feb 2016, **5th International Conference on Pattern Recognition Applications and Methods (ICPRAM)**, Rome, Italy
- 10–11 Dec 2015, **Mathematical Aspects of Big Data: a joint meeting of the LMS and the EMS**, Edinburgh, UK
- 2–4 Dec 2015, **Theoretical and Computational Approaches to Large Scale Inverse Problems**, Alan Turing Institute Scoping Workshop, Edinburgh, UK

- 25–27 Nov 2015, **Distributed Machine Learning and Optimization**, Alan Turing Institute Scoping Workshop, Edinburgh, UK
- 14 Oct 2015, **Data Science Research Day**, Edinburgh, UK
- 15–17 Jun 2015, **17th British-French-German Conference in Optimisation**, London, UK
- 2013, **30th Greek National Mathematics Conference: Mathematics in education, technology and society**, Karditsa, Greece
- 2011, **28th Greek National mathematics Conference: Mathematical Modelling - Applications in science and technology**, Athens, Greece

## Summer Schools and Other Training for PhD Students

- **Graduate Summer School 2016: The Mathematics of Data**, 30 June – 20 July 2016, Utah, USA (20 % acceptance rate)
- **Convex Optimization; NATCOR Course**, 13–17 June 2016, Edinburgh, UK
- **Machine Learning Summer School (MLSS)**, 11–21 May 2016, Cadiz, Spain (30% acceptance rate)
- **1st Year Training Courses:**  
Foundations of Optimization (Reading Course), Nonlinear Optimization, Modern Optimization Methods for Big Data Problems, Introduction to Research in Data Science (School of Informatics)
- **MSc degree (Imperial), Main Courses:** Computational Finance, Computing for Optimal Decisions, Operations Research, Simulation and Modeling, Complex Systems, Intelligent Data Analysis and Probabilistic Inference, Machine Learning, Introduction to Bioinformatics, Graphics.

## Teaching

### Tutor for the courses:

Spring 2017: Modern Optimization Methods for Big Data Problems, Optimization in Finance

Autumn 2016: Fundamentals of optimization, Simulation, Probability

Spring 2016: Proofs and Problem Solving

## Professional Service:

Reviewer for:

*European Journal of Operational Research, Numerical Algorithms*

## Work experience

### District administration Larnaca - Lifeguard, summers of 2010- 2014

- Swimming and first aid training between 1999 and 2014 and achievement of multiple lifeguard qualifications. Recently qualified as a lifeguard trainer.

- Responsible for a team of 14 lifeguards at the most popular beach in Larnaca - Makenzy beach. This requires the utmost concentration on my part, as well as the coordination of the team so as to ensure the safety of the general public.
- The position also requires swift decision making and calmness when facing dangerous situations, which has enhanced my problem-solving ability.

#### **Cypriot National Guard - Second Lieutenant, 2008 - 2010**

- Selected through a competitive nationwide IQ and physical exams as part of mandatory military service.
- Underwent four months of intensive training in leadership in Nea Peramos Military School, Athens, Greece.
- Served remainder of two years as a Second Lieutenant in Artillery Battalion.
- Acted as commanding officer of a platoon of thirty soldiers.

### **Skills and interests**

- **Computer Skills:**

- Operating systems: Microsoft Windows, Linux, Mac OSX
- Programming languages: Julia, Matlab, Python,  $\LaTeX$
- Optimization Software: Yalmip, CVX

- **Interests:**

- Swimming: Avid swimmer, competing in countless Pancyprian competitions and gaining numerous medals.
- Music, film, reading and traveling.
- Member of: SIAM, EMS (Edinburgh mathematical society), SPS (Signal Processing Society)

- **Languages:**

- Greek (native)
- English (fluent)