

# Barnabé Monnot

Year 4 PhD Candidate

Algorithmic game theory and large systems

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## Education

2014–Now **PhD Candidate in Engineering Systems & Design**, *Singapore University of Technology and Design*, Singapore.

Thesis in algorithmic game theory under the direction of Prof. Georgios Piliouras. Special interest in smart cities and transportation.

Lead analysis of a large granular dataset collected from sensors carried by over 80,000 students in Singapore. Theoretical results in algorithmic game theory. Developed, ran and analyzed behavioral experiments with over 200 subjects. Publications in major international conferences.

Working title: **Efficiency, Regret and Inequality in Decentralized Systems**

Summary: We explore connected questions related to decentralized systems and the Price of Anarchy in particular, an ubiquitous efficiency measure for systems of strategic agents:

- What does a large scale experiment on Singapore's routing network tell us about the efficiency of the system and the regret of its users? [\[Link\]](#)
- Does increased efficiency naturally lead to increased inequality in routing games? [\[Link\]](#)
- How inefficient are learning agents following no-regret algorithms? [\[Link\]](#)
- How can a game be tilted away from bad equilibria towards optimum? *[In Progress]*

2012–2014 **Master in Applied Mathematics**, *Université Paris Dauphine*, France.

Specialization in PDEs and game theory with application to stochastic and financial modeling.

Master thesis redacted under the direction of Prof. Nicolas Vieille.

Summary: We review two papers under the stochastic games framework and propose an extension in the case of noisy communication.

2009–2012 **Licence in Applied Mathematics**, *Université Paris Dauphine*, France.

Exchange semester in University of Hong Kong, summer programs in University of Chicago and Copenhagen Business School.

## Experience

Summer 2013 **Data Analyst Internship**, *Lemon Way*, Paris, France.

Research on unsupervised methods for clustering accounts and outlier detection. Developed visual tools to interactively explore data collected by the mobile payment company, with applications to targeting fraudulent accounts.

Summer 2012 **Research Internship**, *Université Paris Dauphine*, France.

Work under Prof. Françoise Forges in game theory, with a focus on public good games.

## Programming tools

Analytics Scala/Spark, R (dplyr, ggplot), SQL

Web Apps HTML/CSS, Javascript (D3), Node.js, MongoDB

Scientific Octave/Matlab, Mathematica

General Python, C, git

## Languages

French Native Speaker

English Near Native

Spanish Intermediate

Japanese Beginner

## Recommendations

Prof. Georgios Piliouras, [georgios@sutd.edu.sg](mailto:georgios@sutd.edu.sg)

Prof. Christos Papadimitriou, [christos@berkeley.edu](mailto:christos@berkeley.edu)

Prof. Marco Scarsini, [marco.scarsini@gmail.com](mailto:marco.scarsini@gmail.com)

## Publications

Barnabé Monnot, Francisco Benita, and Georgios Piliouras. Routing games in the wild: Efficiency, equilibration and regret. In *International Conference on Web and Internet Economics*, pages 340–353. Springer, 2017.

Barnabé Monnot and Georgios Piliouras. Limits and limitations of no-regret learning in games. *The Knowledge Engineering Review*, 32, 2017.

Barnabé Monnot, Erik Wilhelm, Georgios Piliouras, Yuren Zhou, Daniel Dahlmeier, Hai Yun Lu, and Wang Jin. Inferring activities and optimal trips: Lessons from singapore’s national science experiment. In *Complex Systems Design & Management Asia*, pages 247–264. Springer, 2016.

Barnabé Monnot and Justin Ruths. Sensitivity of network controllability to weight-based edge thresholding. In *Complex Networks VII*, pages 45–61. Springer International Publishing, 2016.

## Manuscripts

Kurtuluş Gemici, Elias Koutsoupias, Barnabé Monnot, Christos Papadimitriou, Georgios Piliouras. Wealth Inequality and the Price of Anarchy, 2018. arXiv:1802.09269. Submitted for review. [\[Link\]](#)

## Teaching

- Spring 2016 Teaching Assistant in Networked Life with Prof. Costas Courcoubetis, SUTD. Developed machine learning project on collaborative filtering with restricted Boltzmann machines [\[Link\]](#). Received Outstanding Teaching Assistant award.
- Summer 2015 Teaching Assistant in Mathematical Finance with Prof. Daniel Mitchell, SUTD.
- 2015–2016 Taught French two hours per week, approx. 20 weeks for French Connection Student Club at SUTD.
- 2012–2014 Private tuition in Mathematics, middle school to University students.

## Other activities

- 2015–Now ESD Graduate Seminar main organizer.
- 2015–2017 Development of arenaLabs, online platform to run large behavioral experiments. Web application written in Node.js, supported by Heroku and MongoDB. Platform is used in subsequent research.
- 2010–2015 Co-founder of *iPhilo*, philosophy news and essays magazine + iOS application. Responsible for developing the iOS platform in Objective-C.
- 2010–2014 Founding member of Dauphine’s student newspaper, *La Plume*. General secretary (2012–2013), layout designer, website administrator.

## Grants and awards

- Spring 2016 Outstanding Teaching Assistant for Networked Life, SUTD.
- 2014–2018 President Graduate Fellowship scholarship for graduate studies in Singapore.
- 2012 Grand Prize in Political short story competition, Conférence Olivaint, Paris.

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## Conference and seminar talks

- Dec. 2017 Routing Games in the Wild: Efficiency, Equilibration and Regret, WINE 2017, Bangalore, India. **[Link]**
- Jul. 2017 How bad is selfish routing in practice? in Fairness, Accountability and Transparency in Artificial Intelligence (FAT-SG).
- Jul. 2017 Machine Learning: A Flyover, videoconference with Tehran Node of Global Summer School (GSS), Institute for Advanced Architecture of Catalonia. **[Link]**
- Jul. 2017 Science, Technology and Policy in Singapore week-long workshop, co-organized by SUTD, NUS, MIT and ETH. Part of the Smart Mobility team, wrote a report on transportation public policy in Singapore.
- Mar. 2017 Using Mechanical Turk for Behavioral Experiments, Humans of SUTD workshop, SUTD.
- Jan. 2017 Participated in the first Singapore Mathematical Modelisation Challenge, held in SUTD.
- May 2016 Limits and Limitations of No-Regret Learning in Games, AAMAS 2016, Adaptive Learning Agents workshop, Singapore. **[Link]**
- Apr. 2016 Introduction to D3, SUTD. **[Link]**
- Mar. 2016 Sensitivity of Network Controllability to Weight-Based Edge Thresholding, CompleNet 2016, Dijon, France.
- Feb. 2016 Inferring Activities and Optimal Trips: Lessons From Singapore's National Science Experiment, CSD&M Asia 2016, Singapore.
- Dec. 2015 A soft intro to Mean Field Games, ESD Graduate Seminar, SUTD. **[Link]**
- Oct. 2015 Economics and Computation workshop, invited to attend, UC Berkeley, USA.

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## Completed online courses

- Spring 2017 Bitcoin and Cryptocurrency Technologies, Princeton
- Fall 2016 Functional Programming in Scala + Big Data Analysis with Spark (5-part course), EPFL
- Summer 2016 Neural Networks for Machine Learning, University of Toronto
- Spring 2015 Machine Learning, Stanford

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## Other courses

- Spring 2016 Intellectual Property Clinic, 12 hour course, SUTD

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## Interests

Cinema, Cycling, Travels, Literature