Lilian Besson

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Teacher in Computer Science at Lycée Kléber (in Strasbourg) ● PhD from CentraleSupélec in 2019 (in Rennes)
Ranked 23rd at maths "agrégation" (CS major) in 2014 ● Born the 12nd January 1993 at Briançon, France.

Teaching experiences $\simeq$ **1400h in 10 years**

I am a serious and rigorous teacher, I love to communicate my passion for theoretical computer science, efficient and elegant programming, and mathematics. Everything I write is published on-line, ↪ `besson.link/teaching.en.html`

(1) Lycée Kléber (about 540h/year as "*agrégé*" teacher)   Strasbourg
*Full-time teaching computer science in "*classe préparatoire*" MP2I.*   *Sept.* 2021 *to* **currently**
In charge of every part of the teaching in *MP2I*: practical sessions to learn programming (in SQL, Python, C and OCaml), exercises sessions to learn theoretical computer science, courses, oral and written exams, personal research project, etc. All this for a class of 48 students, with about 15 hours of teaching weekly.

(2) ENS Rennes (154h)   Bruz
Training for the maths "agrégation", Computer Science major.   *Sept.* 2016 *to June* 2019
In charge of programming practical sessions (with Python & OCaml) for training for the oral exams in theoretical computer science, ex. logic & algorithmic (40h in 2016-17 and 2017-18, et 54h in 2018-19). I rated internship research reports and oral defense exams for L3 and M1 students at ENS Rennes (10h in sept. 2017 and 2018).
I corrected *all* the annals texts for the CS modelling oral exam, ↪ `besson.link/notebooks/agreg`

(3) ENSAI (48h)   Bruz
Tutoring and teaching for theoretical computer science (24h/year).   *Fall* 2016 & 2017
Calculability and complexity, with Turing Machines. In charge of practical sessions and written exams for +3 students.

(4) Lycées Chateaubriand & Joliot-Curie (28h)   Rennes
CS practical session in prep'schools, with OCaml in MPSI & with Python in PSI.   *Spring* 2017 & 2018 & 2019

(5) Lycée Lakanal (120h)   Sceaux
Maths oral exams and Python practical sessions in prep' schools (MP & BCPST). *Sept.* 2015 *to June* 2016
Conception and grading of Python 3 practical sessions and exams of "Introduction to Computer Science" in MP (+2).
The resources I wrote online receive about 8000 yearly visits, ↪ `perso.crans.org/besson/infoMP`

(6) Mahindra École Centrale (250h)   Hyderabad, India
Teaching assistant at full time.   *July* 2014 *to May* 2015
Tutorials in maths; practical sessions and lectures in CS, for +1 students, at Mahindra École Centrale. It is an international Indian-French partnership between the École Centrale Paris engineering school and the Mahindra group, opened in July 2014 with 231 Indians students of 17-19 years old. Conception of the curriculum, conception and grading of tutorial and exam sheets, huge pedagogical and logistic investment. Everything was in English. I was also in charge of training a team of 10 teachers to LaTeX, git and Python 2 in fall 2014, for the CS101 course in spring 2015, and of some hackathons for 80 students. Resources published on `perso.crans.org/besson/cs101`, ma101, ma102

(7) Voluntarily & Cours Thalès & Correction Rue Ulm (80h)   Paris
Maths private lessons, and grading of written exams at high-school level (40h/year). *Sept.* 2012 *to June* 2014

Research experiences

In my thesis, I study the applications of multi-armed bandit algorithms for optimization problems of a network of communicating objects, as well as other bandit models, ↪ `besson.link/research.en.html`

Publications in journals

○ *Efficient Change-Point Detection for Tackling Piecewise-Stationary Bandits*, by **L. Besson** & E. Kaufmann & O.-A. Maillard & J. Seznec. Journal of Machine Learning Research, 2022, <u>HAL-02006471</u>.

○ *Decentralized spectrum learning for radio collision mitigation in ultra-dense IoT networks: LoRaWAN case study and experiments*, by C. Moy & **L. Besson** & G. Delbarre & L. Toutain. Annals of Telecommunications - Annales des Télécommunications, 2020, 75 (11-12), pp.711-727, 2020, HAL-02956350.

Publications in International Conferences with Proceedings

○ *Analyse non asymptotique d'un test séquentiel de détection de ruptures et application aux bandits non stationnaires* (in French), by **L. Besson** & E. Kaufmann. GRETSI, Lille, France, August 2019, HAL-02006471.

○ *Decentralized Spectrum Learning for IoT Wireless Networks Collision Mitigation*, by C. Moy & **L. Besson**. ISIoT workshop, Santorini, Greece, May 2019. HAL-02144465.

○ *Upper-Confidence Bound for Channel Selection in LPWA Networks with Retransmissions*, by R. Bonnefoi, **L. Besson**, J. Manco-Vasquez & C. Moy. MOTIoN workshop, Marrakech, Morocco, April 2019, HAL-02049824.

○ *GNU Radio Implementation of MALIN: "Multi-Armed bandits Learning for Internet-of-things Networks"*, by **L. Besson**, R. Bonnefoi & C. Moy. IEEE WCNC, Marrakech, Morocco, April 2019, HAL-02006825.

○ *Multi-Player Bandits Revisited*, by **L. Besson** & E. Kaufmann. ALT (*Algorithmic Learning Theory*), Lanzarote, Spain, April 2018, HAL-01629733.

○ *Aggregation of Multi-Armed Bandits learning algorithms for Opportunistic Spectrum Access*, by **L. Besson**, E. Kaufmann & C. Moy. IEEE WCNC, Barcelone, Spain, April 2018, HAL-01705292.

○ *Multi-Armed Bandit Learning in IoT Networks and non-stationary settings*, by R. Bonnefoi, **L. Besson**, C. Moy, E. Kaufmann & J. Palicot. CrownCom (*Conference on Cognitive Radio Oriented Wireless Networks*), Lisboa, Portugal, Septembre 2017, HAL-01575419, **prix du meilleur article**.

Research articles

Submitted works or in progress works waiting for a new submission.

○ *SMPyBandits: an Open-Source Research Framework for Single and Multi-Players Multi-Arms Bandits (MAB) Algorithms in Python*, by **L. Besson**, active development since October 2016, HAL-01840022. Code on GitHub.com/SMPyBandits ($\simeq 40000$ lines), documentation on SMPyBandits.rtfd.io

○ *What Doubling-Trick Can and Can't Do for Multi-Armed Bandits*, by **L. Besson** & E. Kaufmann, September 2018, HAL-01736357.

○ *MALIN: "Multi-Arm bandit Learning for Iot Networks" with GRC: A TestBed Implementation and Demonstration that Learning Helps*, by **L. Besson** & R. Bonnefoi & C. Moy. Démonstration presented at ICT (*International Conference on Communication*), Saint-Malo, France, June 2018. Cf. YouTu.be/HospLNQhcMk

Presentations in seminars and conferences

About 25 presentations given since 2011, ↪ slides published on besson.link/slides

Seminars: team SequeL (Inria Lille) Sept. and Dec. 2017, SCEE (CentraleSupélec, Rennes campus) Oct. 2017 and Feb. 2018, GDR ISIS day (Paris) Nov. 2017, ENSAI (Bruz) Jan. 2018, CMAP (École Polytechnique) Oct. 2018.

Tutorial: presentation the Julia language, at IETR seminar, Vannes, June 2018, with Pierre Haessig, CEL-01830248.

Traning: in charge of "GouTP" training sessions for PhD students at CentraleSupélec Rennes (about 30). Various training sessions of 1h since Jan. 2017, I gave about 12 (Python, git, HAL, Julia, BibTeX...).

Summer School: *Machine Learning Summer School* (MLSS), at Cadiz (Spain), for a research poster, May 2016.

Other experiences

Responsabilities: president of the PhD Students Association of IETR lab (ADDI) in 2017. In charge of organizing the PhD Students day at Rennes, in June 2017, with about 350 people, and presentation of a research poster. I also helped for the organization and presented a poster at IETR seminar, Vannes, June 2018.

Reviews: for *European Workshop on Reinforcement Learning* (Lille), Oct. 2018 (5 *reviews*), and I helped colleagues for the international conferences *ECAI*, *AMASS*, *ICC* and *AISTATS* 2019, *NeurIPS* 2018 et 2017 (10 *reviews*).

System Administrator: maintaining our workstations running GNU/Linux and Windows at SCEE team, and our cognitive radio testbed using USRP cards and the GNU Radio software (Jan. 2017 to June 2019).

Other skills

Passionnate of programming and technologies, I deeply want to share knowledge and technologies openly, and respect privacy of everybody. Regularly active on GitHub and Bitbucket (with Git), et Wikipedia. Convinced of the benefits of free software, all my resources are published online under open-source license (MIT) since 2012. Python expert, I contributed to scientific modules (`numpy`, `matplotlib`, Jupyter etc), and published about 20 various projects using Python and other modern technologies, see `Naereen.GitHub.io`.

Recreation

- **Languages**: **French**, **English** (daily & at work), Spanish (beginner).
- **Sports**: trek and hiking, byke and kick scooter, swimming and running, indoor football.
- **Travelling**: resourceful and autonomous, many trips alone and by hitchhiking ($\simeq 6000$ km).

Computer Science and IT

- **Expert**: `Python` (*research & teaching*), `GNU Bash` (*scripts*), `Caml/OCaml` (*teaching*).
- **Tools**: `Jupyter notebooks` for OCaml and Python, `OCamlDoc` for `OCaml`, `Sphinx` for `Python`, databases (`SQLite`, `SQL`), version control software (`git`, `svn`, `hg`), visios (BBB, `Jitsi`, OBS Studio).
- **Skilled**: `HTML` & `CSS` & `JavaScript` (*web*), `Julia` & `GNU Octave` & `MATLAB` & `SciLab` (*numerical computations*), C/C++, Lua.
- **Knowledgable**: `BASIC` for Casio and Texas Instrument graphic calculators, `GNU Radio`, `nVidia CUDA`.
- **Computers**: expert user, able to manage a group of machines, with `Windows` or `GNU/Linux`.
- **Writing**: daily usage of LaTeX, Beamer (for slides) and `Markdown`, and web pages design.

Recent examples of programming projects (2018)

- **ParcourSup.py**: A complete clone complet, written for pedagogical purpose in Python 3, of the algorithms of Parcoursup (published in June 2018 in Java), to verify them and ease their understanding for French prep' schools students. ↪ `ParcourSupPy.rtfd.io`
- **jsTuring_fr**: A deterministic Turing machines simulator, interactive on a web page, used by 3 batches of students for a course at ENSAI. ↪ `besson.link/publis/jsTuring_fr`
- **OCaml Jupyter**: Contribution to the development of the `Jupyter` *kernel* for the `OCaml` language, to write practical sessions and solutions in Jupyter notebooks, ↪ `github.com/akabe/ocaml-jupyter`

Studies (+9 after baccalauréat)   (2009 − 2019)

- **PhD in applied mathematics, computer science and telecom.**   **CentraleSupélec & Inria**
  Entitled "Multi-players Bandit Algorithms for Internet of Things Networks"   2016 − 2019
  Advised by Christophe Moy (Prof. at Univ. Rennes 1) and Émilie Kaufmann (Researcher at CNRS & Inria Lille).
  I defended my PhD on the 20th of November 2019. Followed more than 150 hours of various doctoral trainings.

- **2nd year of Master of Research (M2 MVA), ranked 1st/115**   **ENS Cachan & Univ. Paris Saclay**
  Master in applied maths, machine learning (summa cum laude).   2015 − 2016

- **2nd year or Master (M2 FESUP) and French "agrégation"**   **ENS Cachan**
  Accepted at mathematics "agrégation", Computer Science major, ranked 23rd (on 275).   2013 − 2014

- **1st year of Master**   **ENS Cachan & Univ. Paris Diderot**
  Double curriculum: mathematics, computer science (cum laude).   2012 − 2013

- **3rd year of Bachelor de Licence**   **ENS Cachan & Univ. Paris Diderot**
  Double curriculum: mathematics, computer science (cum laude).   2011 − 2012

- **Prep school (maths, CS, physics, engineering), ranked 1st/46 then 1st/33. Lycée Thiers, Marseille**
  Accepted at ENS Cachan and Lyon, École Polytechnique, and the École Centrale.   2009 − 2011

Research Internships

- **Internship and Master thesis**   **BIG team, EPFL (at Lausanne, Switzerland)**
  With Pr.Dr. Michael Unser and Dr. Julien Fageot   *April to August* 2016
  "A theoretical study of steerable homogeneous convolutions, and applications to sparse stochastic processes".

- **Internship for my 1st year of Master**   **Équipe PPLV, UCL (at London, U.-K.)**
  With Dr. Jules Villard and Pr.Dr. Peter O'Hearn   *June to August* 2013
  "Towards modularity for planning and robot programs verification".

- **Internship for my 3rd year of Bachelor**   **CMLA (at ENS Cachan)**
  With Pr.Dr. Florian de Vuyst and Dr. Daniel Chauveheid   *February to July* 2012
  "Finite volume methods on `nVidia` graphics card for the compressible Euler equations".