

# Antoine J.-P. Tixier

Artificial Intelligence, Deep Learning, Machine Learning, Data Science  
Graph Mining, Social Network Analysis, Natural Language Processing

✉ antoine.tixier-1@colorado.edu

🖱 Website: <http://www.lix.polytechnique.fr/~anti5662/>



👛 PROFESSIONAL EXPERIENCE ▶ **Postdoctoral Researcher**, École Polytechnique, France Nov 2015 - present  
*Graph & Text Mining - CS Dept., DaSciM team*

Advisor: M. Vazirgiannis. Research revolving around the key idea that *graphs can be represented as text and text can be represented as graphs*. Work on social, bioinformatics, word nets.

- Deep learning:
  - for networks: classification, node embeddings, link prediction.
  - for NLP: text classification, sentence matching, summarization.
- Influential spreader detection.
- Theorization of research ideas, design and implementation of experiments, writing and presentation of articles.
- Writing of proposals to public funding agencies and private companies.
- In charge of work package #5 (6 people) of the €11M OpenPaaS::NG project.
- Supervision of PhD/MS students and interns.
- Development of interactive web apps to demo research (e.g., GoWvis, DNLPvis).
- Contribution of open source code. One 🏠 repository with ★ 230+.

▶ **Data Science Consultant**, remote 2016 - present

- Technical leader of [www.safetyfunction.com](http://www.safetyfunction.com), developing AI solutions to improve safety performance of major construction companies.
- Freelance work.
- Advisor for startups.

▶ **Graduate Research Assistant**, University of Colorado at Boulder, USA 2012-2015  
*Colorado Construction Safety Laboratory*

Research funded by the NSF (\$400K project) and the private sector.

- Data cleaning, diagnostics, mining, visualization, feature engineering.
- NLP: attribute extraction from unstructured textual injury reports.
- Machine learning: predictive modeling of construction injuries.
- Probability and statistics: multivariate safety risk modeling and simulation.
- Reporting to sponsors via conference calls and presentations.
- Collaboration with sponsors' IT teams for deployment of predictive models.

▶ **Site Manager**, Paris greater area, France May-Aug 2011

*ARTIS construction*. €12M project. Daily coordination of 6 trades (30 people). Worked under pressure within a tight schedule and budget. Quality checking, reporting to owner.

▶ **City Engineer**, Montréal, Québec, Canada Jul-Aug 2010

*City of Montréal*. Many assignments from CAD to site supervision, surveying, and pricing.

## 🏛 TEACHING

▶ **Introduction to Text Mining and NLP (INF 582)** Spring 2017,18

*École Polytechnique, France (3<sup>rd</sup> year students).*

Professor: Michalis Vazirgiannis

Topics: text representations (vector space model, word graphs, word and document embeddings), information retrieval, keyword extraction, unsupervised and supervised document classification, deep learning for NLP.

Mission: prepared code, data and handout for weekly 2-hour lab sessions

▶ **Advanced Learning for Text and Graph Data (ALTeGraD)** Spring 2016,17, Fall 2017,18  
*MVA of ENS Cachan & MDS of École Polytechnique* (top engineering schools grads specializing in data science).

Professor: Michalis Vazirgiannis

Topics: same as INF 582 + graph theory concepts, community detection, identification of influential spreaders, influence maximization, graph kernels, and deep learning for graphs.  
Mission: same as INF 582 + created from scratch, administrated, and graded two Kaggle in-class competitions to evaluate students:  
 - email recipient recommendation (58 teams, 133 players)  
 - link prediction in citation networks (36 teams, 88 players)

➤ **Probability, Statistics and Decisions for Civil Engineers (CVEN 3227)** Spring 2014  
*University of Colorado at Boulder, USA* (undergrads).

Professor: Ross B. Corotis

Topics: probability theory, random variables and probability distributions, covariance, stochastic processes, parameter estimation, probability density estimation, confidence intervals, statistical inference, hypothesis testing, regression/correlation analyses.

Mission: held bi-weekly office hours (15 students), gave 5 lectures throughout the semester (85 students). Designed and graded midterms and finals.

🏆 **Best TA award.**

🎓 EDUCATION

➤ **Ph.D. in Civil Engineering** - GPA: 3.95/4.00 2013-2015

*University of Colorado at Boulder, USA*

Advisors: Matthew R. Hallowell, Balaji Rajagopalan

Program ranked 9/145 in the US. Took statistics and machine learning courses with applications to hydroclimatology. Methods learned: CART, Bagging, Random Forest, Boosting, SVM, PCA, clustering (k-means, k-nn, hierarchical...), kernel density estimation, copulas, bootstrapping, Monte Carlo, risk analysis, Extreme Value Theory, (non)parametric regression, time series analysis, spatial analysis.

🏆 **Doctoral Assistantship for Excellence.**

➤ **M.S. in Civil Engineering** - GPA: 3.88/4.00 2011-2013

*University of Colorado at Boulder, USA*

Construction engineering, statistics, productivity, project management (lean/agile approaches).

**Master's Research Thesis, 🏆 Research Assistantship** (2 semesters).

➤ **M.S. in Mechanical & Electrical Engineering** 2009-2011

*ESTP Paris, France.* Maths, Physics, CS, structures, materials, electronics, mechanics, hydraulics... Merit-based selection for the double degree program with CU Boulder.

➤ **Classes préparatoires MPSI-MP** 2007-2009

*Lycée Sainte-Marie, Antony, France.* Intense training in Maths and Physics.

🏆 HONORS & AWARDS

- Best Teaching Assistant, Civil Engineering Dept., CU Boulder Spring 2014
- Best Paper (CEM track), 120<sup>th</sup> ASEE Annual Conference, Atlanta, GA June 2013
- Doctoral Assistantship for Excellence, Civil Engineering Dept., CU Boulder April 2013

</> COMPUTER SKILLS

Python 2/3, R, Keras, TensorFlow. Web apps with Shiny (reactive programming) and {C3, D3, vis}.js. APIs with Flask, Plumber, and Heroku.  $\LaTeX$ , HTML. Windows, Unix. Parallel and batch processing, cluster computing.

🗨️ LANGUAGES

English: fluent, French: native.

☑️ SERVICE

Reviewer for WSDM 2017, CIKM 2016, AAAI 2017

OTHER

IT: Colorado Construction Safety Laboratory website maintainer 2012-2015  
 Tennis: regional vice-champion (Paris area) with ESTP team, 1<sup>st</sup> division 2011

👥 ADVISEES

- Ph.D.**
- Guokan Shang (École Polytechnique/Linagora), *abstractive summarization* current  
 (one ACL paper)

## M.S.

### Internships:

- Armita Khajeh Nassiri, *neural graph classification* (co-advised with Giannis Nikolentzos) Apr-May 2018
- Guillaume Leroy (2<sup>nd</sup> year ENSTA ParisTech), *graph node embeddings* May-Aug 2017

### École Polytechnique 3<sup>rd</sup> year research project (Nov-Mar):

- Wenjian Dong & Runtian Zhang, *hierarchical self-attention* 2018-19
- Zekun Zhang & Wensi Ding, *abstractive summarization (one ACL paper)* 2016-17
- Irina Stolbova, *sentiment analysis* 2016-17
- Ndeye Fatou Diop, *word specificity scoring* 2016-17
- Dmitry Zhukov & Danilo Augusto, *graph-of-words embeddings* 2015-16

## SELECTED PUBLICATIONS

### • Preprints

**Tixier, Antoine J.-P.** Notes on Deep Learning for NLP, *arXiv preprint 1808.09772*. 2018.

**Tixier, Antoine J.-P.**, Maria-Evgenia G. Rossi, Fragkiskos D. Malliaros, Jesse Read, and Michalis Vazirgiannis. Perturb and Combine to Identify Influential Spreaders in Real-World Networks *arXiv preprint 1807.09586*. 2018.

**Tixier, Antoine J.-P.**, Giannis Nikolentzos, Polykarpos Meladianos, and Michalis Vazirgiannis. Classifying Graphs as Images with Convolutional Neural Networks, *arXiv preprint 1708.02218*. 2017.

### • Conference

Guokan Shang, Wensi Ding, Zekun Zhang, **Tixier, Antoine J.-P.**, Polykarpos Meladianos, Michalis Vazirgiannis, and Jean-Pierre Lorré. Unsupervised Abstractive Meeting Summarization with Multi-Sentence Compression and Budgeted Submodular Maximization *arXiv preprint 1805.05271*. In: *ACL 2018*.

Giannis Nikolentzos, Polykarpos Meladianos, **Tixier, Antoine J.-P.**, Konstantinos Skianis, and Michalis Vazirgiannis. Kernel Graph Convolutional Neural Networks, *arXiv preprint 1710.10689*. In: *ICANN 2018*.

**Tixier, Antoine J.-P.**, Polykarpos Meladianos, and Michalis Vazirgiannis. Combining Graph Degeneracy and Submodularity for Unsupervised Extractive Summarization. In: *EMNLP New Frontiers in Summarization Workshop*. 2017, pp. 48–58.

Polykarpos Meladianos, **Tixier, Antoine J.-P.**, Giannis Nikolentzos, and Michalis Vazirgiannis. Real-Time Keyword Extraction from Conversations. In: *EACL*. 2017, p. 462.

**Tixier, Antoine J.-P.**, Fragkiskos Malliaros, and Michalis Vazirgiannis. A Graph Degeneracy-based Approach to Keyword Extraction. In: *EMNLP*. 2016, pp. 1860–1870.

**Tixier, Antoine J.-P.**, Konstantinos Skianis, and Michalis Vazirgiannis. GoWvis: a web application for Graph-of-Words-based text visualization and summarization. In: *ACL demo track*. 2016, p. 151.

**Tixier, Antoine J.-P.**, Alex Albert, and Matthew R. Hallowell. Teaching Construction Hazard Recognition through High Fidelity Augmented Reality. In: *ASEE*. 2013. 🏆 **Best Paper Award**.

### • Journal

**Tixier, Antoine J.-P.**, Matthew R. Hallowell, and Balaji Rajagopalan. Construction Safety Risk Modeling and Simulation. In: *Risk Analysis* (2017).

**Tixier, Antoine J.-P.**, Matthew R. Hallowell, Balaji Rajagopalan, and Dean Bowman. Construction Safety Clash Detection: Identifying Safety Incompatibilities among Fundamental Attributes using Data Mining. In: *Automation in Construction* 74 (2017), pp. 39–54.

**Tixier, Antoine J.-P.**, Matthew R. Hallowell, Balaji Rajagopalan, and Dean Bowman. Application of Machine Learning to Construction Injury Prediction. In: *Automation in Construction* 69 (2016), pp. 102–114.

**Tixier, Antoine J.-P.**, Matthew R. Hallowell, Balaji Rajagopalan, and Dean Bowman. Automated Content Analysis for Construction Safety: A Natural Language Processing System to Extract Precursors and Outcomes from Unstructured Injury Reports. In: *Automation in Construction* 62 (2016), pp. 45–56.