

Antoine J.-P. Tixier

Artificial Intelligence, Deep Learning, Machine Learning, Data Science

Graph Mining, Social Network Analysis, Natural Language Processing

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

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

- Deep learning for graph classification, node embeddings, link prediction, node classification. Applications to biological, social, and word graphs.
- Deep learning for NLP: document classification & speech transcription summarization.
- Influential spreader detection in social and word networks (keyword extraction).
- In charge of work package #5 (6 people) of the €11M OpenPaaS::NG project.
- Theorization of research ideas, design and implementation of experiments, writing and presentation of articles.
- Writing of proposals to public funding agencies and private companies.
- Supervision of PhD/MS students and interns.
- Development of interactive web applications.

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

- Technical leader of 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, 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, vulgarization of the results.
- 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 (3rd year students).

Professor: Michalis Vazirgiannis

Topics: text representations (vector space model, graph-of-words, 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
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. Focused on statistics, data analysis, and programming 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 Award.**

➤ **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), 120th ASEE Annual Conference, Atlanta, GA June 2013
- Doctoral Assistantship for Excellence, Civil Engineering Dept., CU Boulder April 2013

</> COMPUTER SKILLS

Python, R, Shiny, Flask, Spark, cluster computing, parallel processing, \LaTeX , HTML. Windows, Unix.

🗨️ 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, 1st division 2011

ADVISEES

Ph.D.

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

M.S.

Internships:

- Armita Khajeh Nassiri, *neural graph classification* Apr-May 2018 (co-advised with Giannis Nikolentzos)

- Guillaume Leroy (2nd year ENSTA ParisTech), *graph node embeddings* May-Aug 2017

École Polytechnique 3rd year research project (Nov-Mar):

- Zekun Zhang, *abstractive summarization (one ACL paper)* 2016-17
- 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, *graph-of-words embeddings* 2015-16
- Danilo Augusto, *graph-of-words embeddings* 2015-16

SELECTED PUBLICATIONS

• Preprints

Giannis Nikolentzos, Polykarpos Meladianos, **Tixier, Antoine J.-P.**, Konstantinos Skianis, and Michalis Vazirgiannis. Kernel Graph Convolutional Neural Networks, *arXiv preprint 1710.10689*. 2017.

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. In: *arXiv preprint arXiv:1805.05271*, to appear in *ACL 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.

• Notes

Tixier, Antoine J.-P. *Introduction to CNNs and LSTMs for NLP*. URL: http://www.lix.polytechnique.fr/~anti5662/intro_cnn_lstm_tixier.pdf.

• Ph.D. dissertation

Tixier, Antoine J.-P. Leveraging Unstructured Construction Injury Reports to Predict Safety Outcomes and Model Safety Risk using Natural Language Processing, Machine Learning, and Probability Theory. University of Colorado at Boulder, 2015.

Last updated: May 28, 2018