

# David Alvarez-Melis

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## RESEARCH INTERESTS

- Machine Learning    Structured prediction, neural networks for structured output, semi-supervised learning, domain adaptation.
- N.L.P.    Compositionality, distributional semantics, machine translation.
- Optimization    Submodular/convex/large-scale optimization, semi-definite programming.

## EDUCATION

- 2014 –    **Massachusetts Institute of Technology**, Ph.D in Computer Science.
  - Advisor: Tommi Jaakkola.
  - Area: Machine Learning and Natural Language Processing.
- 2011 – 2013    **Courant Institute, New York University**, New York, M.S. in Mathematics.
  - Advisor: Dr. Mehryar Mohri.
  - Thesis: *The Matrix Multiplicative Weights Algorithm for Domain Adaptation*.
  - GPA: 3.975.
- 2006 – 2011    **Instituto Tecnológico Autónomo de México**, Mexico City, B.S. (Licenciatura) in Applied Mathematics.
  - Advisor: Dr. Carlos Bosch Giral
  - Thesis: *The Lax-Milgram Theorem, Generalizations and Applications*.
  - Grade: 9.74/10, highest honors, top 1% of class, valedictorian.
- 2005 – 2006    **Universidad Nacional Autónoma de México**, Mexico City.
  - Coursework in Architecture.

## RESEARCH AND WORK EXPERIENCE

- 2014 –    **Research Assistant**, *MIT CSAIL*, Cambridge, MA, USA.
  - Supervisor: Tommi Jaakkola.
  - Projects: word embeddings through random walks, structured output decoding, interpretability in sequence-to-sequence models
- 05 – 08/2016    **Research Intern**, *Microsoft Research*, Redmond, WA, USA.
  - Mentors: Scott Yih, Ming-Wei Chang, Kristina Toutanova, Chris Meek.
  - Project: Multi-hop relation prediction for knowledge base question answering.
- 2013 – 2014    **Supplemental Researcher**, *IBM Research*, TJ Watson Center, NY, USA.
  - Mentors: Michael Picheny & Ken Church (speech recognition group)
  - Data mining, statistical modeling and machine learning for speech recognition data.
  - Research on semi-supervised gender speaker identification with side information.
- 2009 – 2010    **Statistical Analyst**, *LasQuinceLetras Solutions*, Mexico City, Mexico.
  - Designed and carried out statistical learning methods on large survey databases.
  - Specialized on segmentation analysis, brand equity research and market trends.
- 2009 – 2010    **Research Assistant**, *ITAM*, Mexico City.
  - Under the supervision of Dr. Carlos Bosch. Projects: (i) the Lax-Milgram Theorem, (ii) Compiling a book with problems from the National Mathematical Olympiad.

## TEACHING EXPERIENCE

- Spring 2015 **Teaching Assistant**, *6.033: Introduction to Machine Learning*, MIT.  
Spring 2013 **Adjunct Instructor (TA)**, *MATH-UA.121: Calculus I*, NYU.  
Fall 2012 **Adjunct Instructor (TA)**, *MATH-UA.9: Algebra and Calculus*, NYU.  
Spring 2012 **Grader**, *MATH-UA.326: Analysis II*, NYU.  
2010 – 2011 **Teaching Assistant**, *Calculus I*, ITAM.  
Spring 08/09 **Teaching Assistant**, *Economics III (Intermediate Microeconomics)*, ITAM.

## SCHOLARSHIPS AND AWARDS

- 2014 – 2018 **Scholarship for graduate studies abroad**, *CONACYT (Mexican Council of Science and Technology)*.  
2011 – 2013 **Scholarship for graduate studies abroad**, *CONACYT (Mexican Council of Science and Technology)*.  
April 2013 **Thresis Academic Challenge**, *NYU*, Semifinalist.  
March 2012 **Alumni Research Prize, Second Place**, *ITAM*, XVII Edition, Category: Undergraduate Thesis.  
2012 – 2013 **Award for Graduate Studies Abroad**, *Ministry of Education (Mexico)*, Merit-based.  
October 2011 **Sotero Prieto Prize, Second Place**, *Mexican Mathematical Society*, Yearly award for the best undergraduate theses in mathematics in the country.  
2006 – 2009 **Academic Excellence Scholarship**, *ITAM*, For undergraduate studies.

## PUBLICATIONS

### Peer-reviewed

- [1] **D. Alvarez-Melis** and T. S. Jaakkola. “Tree-structured decoding with doubly-recurrent neural networks”. In: *ICLR 2017: International Conference on Learning Representations*. 2017.
- [2] **D. Alvarez-Melis** and M. Saveski. “Topic Modeling in Twitter: Aggregating Tweets by Conversations”. In: *ICWSM-16: The International AAAI Conference on Web and Social Media*. 2016, pp. 519–522.
- [3] T. B. Hashimoto, **D. Alvarez-Melis**, and T. S. Jaakkola. “Word Embeddings as Metric Recovery in Semantic Spaces”. In: *Trans. Assoc. Comput. Linguist.* 4 (2016), pp. 273–286.
- [4] T. B. Hashimoto, **D. Alvarez-Melis**, and T. S. Jaakkola. “Word, graph and manifold embedding from Markov processes”. In: *NIPS Workshop Nonparametric Methods Large Scale Represent. Learn.* 2015, pp. 1–6.

### Theses

- [5] **D. Alvarez-Melis**. “The Matrix Multiplicative Weights Algorithm for Domain Adaptation”. MA thesis. New York University, May 2013.
- [6] **D. Alvarez-Melis**. “El Teorema de Lax Milgram, Generalizaciones y Aplicaciones”. Instituto Tecnológico Autónomo de México, Feb. 2011.

## PROFESSIONAL ACTIVITIES AND SERVICE

- Prog.Comm. ACL 2017  
Reviewer ACL-IJCNLP 2015 (outstanding reviewer), ACL 2016, ACL 2017  
Other **MIT EECS Graduate Admissions Committee**, 2017  
Other **Orientation Co-Chair**, MIT Graduate Student Council.

## OTHER ACTIVITIES

- October 2015 Talk: *Word Embeddings and Neural Networks in NLP*, DeepLearn Seminar, MIT.  
2007 – 2011 Private tutor for undergraduate students majoring in Economics and Mathematics.  
May 2009/10 Graded exams of the National Mathematics Olympiad.  
May 2009 Talk: *Flatland and the Fourth Dimension*, weekly math seminars, ITAM.

## PROFESSIONAL TRAINING

- July 2014 **Regularization methods for Machine Learning**, *University of Genova*, Genova, PhD summer course taught by Lorenzo Rosasco and Francesca Odone.

## COMPUTER SKILLS

Languages Python, Bash, Java, R, C++, Lua      Libraries Torch, Theano, Tensorflow

## LANGUAGES

- Spanish Native  
English Fluent      *TOEFL (iBT) 113/120, IELTS 8.5/9, FCE, CAE both with Grade A.*  
Italian Advanced      *CILS-Tre Certificate.*  
French Conversational      *Mother's language, studied also at Alliance Française Bordeaux.*  
German Basic      *Completed levels A1 - A2 at Goethe Institut Mexiko.*  
Dutch, Greek Beginner

## PROFESSIONAL MEMBERSHIPS

- 2016 – Association for Computational Linguistics (ACL).  
2013 – Society for Industrial and Applied Mathematics (SIAM).  
2012 – American Mathematical Society (AMS).

## OTHER INTERESTS

Languages, architecture (van der Rohe, Le Corbusier), classical guitar (Albéniz, Sor), Italian cinema, soccer.

## REFERENCES

Available upon request.