

Sebastian Ruder

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Education

- **National University of Ireland** **Galway, Ireland**
College of Engineering and Informatics, Ph.D. Natural Language Processing 10/2015 – Present
 - My main research interests are transfer learning, multi-task learning, domain adaptation, and cross-lingual learning for Natural Language Processing.
 - **University of Copenhagen** **Copenhagen, Denmark**
Natural Language Processing Group, Department of Computer Science 04/2017 – 06/2017
 - Research visit invited by Anders Søgaard.
 - Created a new model for multi-task learning that learns which parts of the model to share.
 - **Ruprecht-Karls-Universität Heidelberg** **Heidelberg, Germany**
Institute of Computational Linguistics, B.A. Computational Linguistics, English Linguistics 10/2012 – 09/2015
 - Final grade: 1.0 (German scale), i.e. GPA 4.0; thesis: *Construction and Analysis of an Emotion Proposition Store*
 - **Trinity College** **Dublin, Ireland**
School of Computer Science and Statistics, Computer Science and Language 09/2014 – 01/2015
 - Semester abroad
 - relevant courses: AI, Fuzzy Logic, High-Tech Entrepreneurship
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Experience

- **AYLIEN** **Dublin, Ireland**
Research Scientist 10/2015 – Present
 - Developed aspect-based sentiment analysis (ABSA) endpoint¹ and created sentiment analysis models on-par with state-of-the-art².
 - Developed models for a novel form of stance detection from scratch. Collected data, crowd-sourced annotations, and iterated upon the models in dialogue with the customer.
 - My current work focuses on productizing research insights by developing efficient transfer learning algorithms and state-of-the-art models for novel problems as well as existing applications such as stance detection and emotion detection.
- **IBM** **Munich, Germany**
Extreme Blue Intern, Watson 08/2015 – 09/2015
 - Design and implementation of text analysis ML components applied to customer data of leading German insurance company *Versicherungskammer Bayern*; automatically identifies structural semantics and sentiment of incoming e-mails, e.g. complaints and classifies email based on reason for complaint.
 - Pitched project to audience at European Expo and was chosen as one of eight teams to pitch to IBM customers; project was referred to as a "lighthouse project for Watson in Europe" by jury members.
 - Project was awarded Digital Thought Leadership award in leading contest of German insurance industry by leading German newspaper *Süddeutsche Zeitung* and Google³ and covered by *Süddeutsche Zeitung*⁴.
- **Microsoft** **Dublin, Ireland**
Linguistic Engineering Intern, Xbox 02/2015 – 06/2015
 - Contributed to developing an ML system for analyzing linguistic complexity of strings in C# for localization prioritization during testing; performed feature analysis and framed problem as anomaly detection.
 - Created proof of concept and implemented morphology-based terminology validation algorithm.

¹<https://developer.aylien.com/text-api-demo?tab=absa>

²<https://developer.aylien.com/text-api-demo?tab=sentiment>

³<https://www.sv-veranstaltungen.de/site/fachbereiche/versicherungs-leuchtturm>

⁴<http://www.sueddeutsche.de/wirtschaft/kuenstliche-intelligenz-aerger-fuer-watson-1.2772927>

- Evangelized customer sentiment analysis efforts, drove cross-team collaboration, and provided insights to stakeholders.
- **The OpenCog Foundation** opencog.org
Google Summer of Code Intern Summer 2014
 - Implemented deductive reasoning algorithms to enable a model to make common-sense inferences, e.g. *All men are mortal. Socrates is a man. → Socrates is mortal.*
 - Applied inference using probabilistic logic networks on the output of a relationship extractor.
 - Documented and extended Python code for temporal inference.
- **Lingenio GmbH** Heidelberg, Germany
Software Engineering Intern Spring 2014
 - Created a converter from TBX to Lingenio native format and vice versa.
 - Integrated TBX term bases in Dictionary Server; created localized web service using Jinja2, Flask-Babel, and lighttpd.
- **SAP** Walldorf, Germany
Working Student, Development University 02/2013 – 02/2014
 - Created content for internal programming and Design Thinking courses.
 - Automated reporting processes, e.g. reduced expenditure of work for monthly training report from 8 hours to 2 hours using Excel / VBA scripts.
- **TEMIS** Heidelberg, Germany
Freelancing Developer 02/2013 – 10/2013
 - Created a cosine metric-based word sense disambiguation system leveraging text extracted from Wikipedia and DBpedia dumps; achieved performance comparable to the state-of-the-art.

Certificates and awards

- Google Developer Expert – Machine Learning 12/2017 – Present
- Scholarship of the Irish Research Council 10/2015 – Present
- Scholarship of the *Cusanuswerk*, one of the 13 German sponsorship organizations 04/2014 – 09/2015
- Microsoft Certified Professional (Programming in C#) 06/2015
- Best Delegate award in various Model United Nations conferences 11/2012 – 01/2014
- Second and third prizes *Bundeswettbewerb Fremdsprachen*, national foreign languages competition 2007 – 2008
- First and second prizes *Landeswettbewerb Mathematik*, state mathematics competition 2006 – 2008

Languages and Technologies

Programming Languages: Python, Java, C#, R, C, \LaTeX , Prolog, JavaScript, SPARQL

Technologies: SciPy, NumPy, Keras, TensorFlow, DyNet, scikit-learn, NLTK, CoreNLP, MALLET, Weka, UNIX, Git

Natural Languages: Fluent in German and English, advanced in French and Spanish, beginner in Portuguese and Latin

Open Source Contributions: The OpenCog Foundation

Other activities

- **Natural Language Processing Dublin organizer** 08/2016 – Present
 - Organized 10 events. Meetup⁵ has 600+ members and connects students, researchers, and industry professionals.

⁵<https://www.meetup.com/NLP-Dublin/>

Publications

1. **Sebastian Ruder***, Ryan Cotterell*, Yova Kementchedjheva, Anders Søgaard. A Discriminative Latent-Variable Model for Bilingual Lexicon Induction. In *Proceedings of EMNLP 2018*, Brussels, Belgium.
2. Yova Kementchedjheva, **Sebastian Ruder**, Ryan Cotterell, Anders Søgaard (2018). Generalizing Procrustes Analysis for Better Bilingual Dictionary Induction. In *Proceedings of CoNLL 2018*, Brussels, Belgium.
3. **Sebastian Ruder**, Barbara Plank (2018). Strong Baselines for Neural Semi-supervised Learning under Domain Shift. In *Proceedings of ACL 2018*, Melbourne, Australia.
4. Jeremy Howard*, **Sebastian Ruder*** (2018). Universal Language Model Fine-tuning for Text Classification. In *Proceedings of ACL 2018*, Melbourne, Australia.
5. Anders Søgaard, **Sebastian Ruder**, Ivan Vulić (2018). On the Limitations of Unsupervised Bilingual Dictionary Induction. In *Proceedings of ACL 2018*, Melbourne, Australia.
6. **Sebastian Ruder**, John Glover, Afshin Mehrabani, Parsa Ghaffari (2018). 360° Stance Detection. In *Proceedings of NAACL-HLT 2018: System Demonstrations*, New Orleans, US.
7. **Sebastian Ruder**, Ivan Vulić, Anders Søgaard (2018). A Survey Of Cross-lingual Word Embedding Models. *Journal of Artificial Intelligence Research*.
8. Isabelle Augenstein*, **Sebastian Ruder***, Anders Søgaard (2018). Multi-task Learning of Pairwise Sequence Classification Tasks Over Disparate Label Spaces. In *Proceedings of NAACL-HLT 2018*, New Orleans, US.
9. **Sebastian Ruder**, Barbara Plank (2017). Learning to select data for transfer learning with Bayesian Optimization. In *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*, Copenhagen, Denmark.
10. **Sebastian Ruder** (2017). An Overview of Multi-Task Learning in Deep Neural Networks. arXiv preprint arXiv:1706.05098.
11. **Sebastian Ruder**, Joachim Bingel, Isabelle Augenstein, Anders Søgaard (2017). Learning what to share between loosely related tasks. arXiv preprint arXiv:1705.08142.
12. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2017). Data Selection Strategies for Multi-Domain Sentiment Analysis. arXiv preprint arXiv:1702.02426.
13. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2017). Knowledge Adaptation: Teaching to Adapt. arXiv preprint arXiv:1702.02052.
14. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2016). Towards a continuous modeling of natural language domains. In *Proceedings of EMNLP 2016 Workshop on Uphill Battles in Language Processing: Scaling Early Achievements to Robust Methods*, pages 53-57, Austin, Texas, US.
15. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2016). A Hierarchical Model of Reviews for Aspect-based Sentiment Analysis. In *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing*, pages 999-1005, Austin, Texas, US.
16. Ian D. Wood and **Sebastian Ruder** (2016). Emoji as emotion tags for tweets. In *Emotion and Sentiment Analysis Workshop, LREC*, Portorož, Slovenia.
17. **Sebastian Ruder**, Peiman Barnaghi, John G. Breslin (2016). Analysis and Applications of a Novel Corpus of Influencers on Twitter. In *Twitter for Research Conference*, Galway, Ireland.
18. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2016). INSIGHT-1 at SemEval-2016 Task 4: Convolutional Neural Networks for Sentiment Classification and Quantification. In *Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval 2016)*, San Diego, US.
19. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2016). INSIGHT-1 at SemEval-2016 Task 5: Convolutional Neural Networks for Multilingual Aspect-based Sentiment Analysis. In *Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval 2016)*, San Diego, US.
20. **Sebastian Ruder** (2016). An overview of gradient descent optimization algorithms. arXiv preprint arXiv:1609.04747.

*Equal contribution.

Services to the community

- **Reviewer for journals:** Transactions on Audio, Speech and Language Processing; Artificial Intelligence; IEEE Computational Intelligence Magazine
 - **Reviewer for workshops:** RELNLP 2018, DeepLo 2018, SemEval-2016 Task 5
 - **Reviewer for conferences:** ACL 2018, EMNLP 2018, CoNLL 2018
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Talks

- Insight@DCU Deep Learning Workshop Keynote, May 2018: Successes and Frontiers of Deep Learning⁶
- Dublin Institute for Technology Computational Intelligence Course Guest Lecture, November 2017: Optimization for Deep Learning⁷
- Natural Language Processing Copenhagen Meetup Talk, May 2017: Transfer Learning for NLP⁸
- Accenture Tech Talk, March 2017: Transfer Learning – The Next Frontier for Machine Learning
- LinkedIn Tech Talk, March 2017: Transfer Learning – The Next Frontier for Machine Learning⁹
- NLP Dublin meetup, December 2016: NIPS 2016 Highlights¹⁰
- INSIGHT SIG NLP meetup, August 2016: A Hierarchical Model of Reviews for Aspect-based Sentiment Analysis¹¹
- NLP Dublin meetup, August 2016: Softmax Approximations for Learning Word Embeddings and Language Modelling¹²

⁶<https://www.slideshare.net/SebastianRuder/successes-and-frontiers-of-deep-learning>

⁷<https://www.slideshare.net/SebastianRuder/optimization-for-deep-learning>

⁸<https://www.slideshare.net/SebastianRuder/transfer-learning-for-natural-language-processing>

⁹<https://www.slideshare.net/SebastianRuder/transfer-learning-the-next-frontier-for-machine-learning>

¹⁰<http://www.slideshare.net/SebastianRuder/nips-2016-highlights-sebastian-ruder>

¹¹<http://www.slideshare.net/SebastianRuder/a-hierarchical-model-of-reviews-for-aspectbased-sentiment-analysis>

¹²<http://www.slideshare.net/SebastianRuder/softmax-approximations-for-learning-word-embeddings-and-language-modeling-sebastian-ruder>