

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

Publications

1. **Sebastian Ruder**, Joachim Bingel, Isabelle Augenstein, Anders Søgaard (2019). Latent Multi-task Architecture Learning. In *Proceedings of AAAI 2019*, Honolulu, Hawaii.
2. Victor Sanh, Thomas Wolf, **Sebastian Ruder**. A Hierarchical Multi-task Approach for Learning Embeddings from Semantic Tasks. In *Proceedings of AAAI 2019*, Honolulu, Hawaii.
3. **Sebastian Ruder***, Ryan Cotterell*, Yova Kementchedjhiya, Anders Søgaard. A Discriminative Latent-Variable Model for Bilingual Lexicon Induction. In *Proceedings of EMNLP 2018*, Brussels, Belgium.

4. Yova Kementchedjheva, **Sebastian Ruder**, Ryan Cotterell, Anders Søgaard (2018). Generalizing Procrustes Analysis for Better Bilingual Dictionary Induction. In *Proceedings of CoNLL 2018*, Brussels, Belgium.
5. **Sebastian Ruder**, Barbara Plank (2018). Strong Baselines for Neural Semi-supervised Learning under Domain Shift. In *Proceedings of ACL 2018*, Melbourne, Australia.
6. Jeremy Howard*, **Sebastian Ruder*** (2018). Universal Language Model Fine-tuning for Text Classification. In *Proceedings of ACL 2018*, Melbourne, Australia.
7. Anders Søgaard, **Sebastian Ruder**, Ivan Vulić (2018). On the Limitations of Unsupervised Bilingual Dictionary Induction. In *Proceedings of ACL 2018*, Melbourne, Australia.
8. **Sebastian Ruder**, John Glover, Afshin Mehrabani, Parsa Ghaffari (2018). 360° Stance Detection. In *Proceedings of NAACL-HLT 2018: System Demonstrations*, New Orleans, US.
9. **Sebastian Ruder**, Ivan Vulić, Anders Søgaard (2018). A Survey Of Cross-lingual Word Embedding Models. *Journal of Artificial Intelligence Research*.
10. 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.
11. **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.
12. **Sebastian Ruder** (2017). An Overview of Multi-Task Learning in Deep Neural Networks. arXiv preprint arXiv:1706.05098.
13. **Sebastian Ruder**, Joachim Bingel, Isabelle Augenstein, Anders Søgaard (2017). Learning what to share between loosely related tasks. arXiv preprint arXiv:1705.08142.
14. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2017). Data Selection Strategies for Multi-Domain Sentiment Analysis. arXiv preprint arXiv:1702.02426.
15. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2017). Knowledge Adaptation: Teaching to Adapt. arXiv preprint arXiv:1702.02052.
16. **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.
17. **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.
18. Ian D. Wood and **Sebastian Ruder** (2016). Emoji as emotion tags for tweets. In *Emotion and Sentiment Analysis Workshop, LREC*, Portorož, Slovenia.
19. **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.
20. **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.
21. **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.
22. **Sebastian Ruder** (2016). An overview of gradient descent optimization algorithms. arXiv preprint arXiv:1609.04747.

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

*Equal contribution.

- **Reviewer for conferences:** ICML 2019, NAACL-HLT 2019, ICLR 2019, ACL 2018, EMNLP 2018, CoNLL 2018
 - **Organizer:** NLP Dublin Meetup⁵, NLP Session at Deep Learning Indaba 2018⁶
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Talks

- Belgium NLP meetup, Brussels, October 2018: Transfer learning with language models⁷
- AI2 Tech Talk, August 2018: Neural Semi-supervised Learning under Domain Shift⁸
- ACL 2018 oral presentation, July 2018: On the Limitations of Unsupervised Bilingual Dictionary Induction⁹
- ACL 2018 oral presentation, July 2018: Strong Baselines for Neural Semi-supervised Learning under Domain Shift¹⁰
- Insight@DCU Deep Learning Workshop Keynote, May 2018: Successes and Frontiers of Deep Learning¹¹
- Dublin Institute for Technology Computational Intelligence Course Guest Lecture, November 2017: Optimization for Deep Learning¹²
- Natural Language Processing Copenhagen Meetup Talk, May 2017: Transfer Learning for NLP¹³
- 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 Learning¹⁴
- NLP Dublin meetup, December 2016: NIPS 2016 Highlights¹⁵
- INSIGHT SIG NLP meetup, August 2016: A Hierarchical Model of Reviews for Aspect-based Sentiment Analysis¹⁶
- NLP Dublin meetup, August 2016: Softmax Approximations for Learning Word Embeddings and Language Modelling¹⁷

⁵<https://www.meetup.com/NLP-Dublin/>

⁶<http://www.deeplearningindaba.com/schedule-2018.html>

⁷https://drive.google.com/open?id=1kmNAwrS1FY0cN_DcURM0ArBwe9FxWxR

⁸<https://drive.google.com/file/d/1osqb6QJT51oLi9-JqQ5GF1UFnYykwN5f/view?usp=sharing>

⁹<https://drive.google.com/open?id=1lmuqvZKd12aLmtcDhscNAqTF190XFggx>

¹⁰https://drive.google.com/open?id=1XisgCR7q75X2eZl8GrALDsMu6iP_5WFh

¹¹https://drive.google.com/file/d/1aP13etcnxy-45hc5H_FLGZtWRiQECa/view?usp=drive_open

¹²https://drive.google.com/open?id=1ipF37k9IjhmNH-HbJkz_Vq2L7gPoeCcE

¹³<https://drive.google.com/open?id=18TMreSIfm2hF5IwmCflvQfA4zTpjWXHt>

¹⁴<https://drive.google.com/open?id=1mI1Lm7J2vx3nXaG0156qLma0Shhr940Z>

¹⁵https://drive.google.com/open?id=1dJHNqZB_VQqU-iJ6qGf5PgS00UJzmufW

¹⁶<https://drive.google.com/open?id=1W-5yNKiEfW1nU3p91ATfbBCUqRcQJ-5I>

¹⁷<https://drive.google.com/open?id=1xog6jez1d5fhL6wBXjuco80awnEOXkv5>