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

Experience

- **AYLIEN** **Dublin, Ireland**
  Research Scientist *10/2015 – Present*
  - Developed aspect-based sentiment analysis (ABSA) endpoint[1] and created sentiment analysis models on-par with state-of-the-art[2].
  - 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 Google[3] 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.* $\rightarrow$ *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 – 02/2019*
- 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

Refereed conference 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 Kementchedjhieva, Anders Søgaard. A Discriminative Latent-Variable Model for Bilingual Lexicon Induction. In *Proceedings of EMNLP 2018*, Brussels, Belgium.

4. Yova Kementchedjhieva, **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. 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.
10. **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.
11. **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.

Journal publications

12. **Sebastian Ruder**, Ivan Vulić, Anders Søgaard (2019). A Survey Of Cross-lingual Word Embedding Models. To be published in *Journal of Artificial Intelligence Research*.

Refereed workshop publications

13. **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.
14. Ian D. Wood and **Sebastian Ruder** (2016). Emoji as emotion tags for tweets. In *Emotion and Sentiment Analysis Workshop, LREC*, Portorož, Slovenia.
15. **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.
16. **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.

Preprints

17. **Sebastian Ruder** (2017). An Overview of Multi-Task Learning in Deep Neural Networks. arXiv preprint arXiv:1706.05098.
18. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2017). Data Selection Strategies for Multi-Domain Sentiment Analysis. arXiv preprint arXiv:1702.02426.
19. **Sebastian Ruder**, Parsa Ghaffari, John G. Breslin (2017). Knowledge Adaptation: Teaching to Adapt. arXiv preprint arXiv:1702.02052.
20. **Sebastian Ruder** (2016). An overview of gradient descent optimization algorithms. arXiv preprint arXiv:1609.04747.

*Equal contribution.

Service and professional activities

- **Reviewer for journals:** Transactions on Audio, Speech and Language Processing; Artificial Intelligence; IEEE Computational Intelligence Magazine; Natural Language Engineering
- **Reviewer for workshops:** RELNLP 2018, DeepLo 2018, SemEval-2016 Task 5
- **Reviewer for conferences:** ACL 2018, 2019; ICML 2019; NAACL-HLT 2019; ICLR 2019; EMNLP 2018; CoNLL 2018
- **Organizer**: NLP Dublin Meetup[5], NLP Session at Deep Learning Indaba 2018[6]
- **Workshop organizer:** 4th Workshop on Representation Learning for NLP (RepL4NLP) at ACL 2019
- **Tutorial organizer:** Transfer Learning in NLP at NAACL-HLT 2019; Unsupervised Cross-lingual Representation Learning at ACL 2019
- **Chair**: Co-publication chair at CoNLL 2019; Co-publicity chair at EMNLP 2019

Talks

- Belgium NLP meetup, Brussels, October 2018: Transfer learning with language models[7]
- AI2 Tech Talk, August 2018: Neural Semi-supervised Learning under Domain Shift[8]
- ACL 2018 oral presentation, July 2018: On the Limitations of Unsupervised Bilingual Dictionary Induction[9]
- ACL 2018 oral presentation, July 2018: Strong Baselines for Neural Semi-supervised Learning under Domain Shift[10]
- Insight@DCU Deep Learning Workshop Keynote, May 2018: Successes and Frontiers of Deep Learning[11]
- Dublin Institute for Technology Computational Intelligence Course Guest Lecture, November 2017: Optimization for Deep Learning[12]
- Natural Language Processing Copenhagen Meetup Talk, May 2017: Transfer Learning for NLP[13]
- 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 Learning[14]
- NLP Dublin meetup, December 2016: NIPS 2016 Highlights[15]
- INSIGHT SIG NLP meetup, August 2016: A Hierarchical Model of Reviews for Aspect-based Sentiment Analysis[16]
- NLP Dublin meetup, August 2016: Softmax Approximations for Learning Word Embeddings and Language Modelling[17]

[5] https://www.meetup.com/NLP-Dublin/
[6] http://www.deeplearningindaba.com/schedule-2018.html
[7] https://drive.google.com/open?id=1kmNAwrSlFYo0cN_DcURMOArBwe9FxWxR
[8] https://drive.google.com/file/d/1osqb6QJT51oLi9-JqQ5GF1UFnYykwN5f/view?usp=sharing
[9] https://drive.google.com/open?id=1lmuqvZKdl2aLmtcDhscNAqTFl9OXFggx
[10] https://drive.google.com/open?id=1XisgCR7q75X2eZl8GrALDsMu6iP_5WFh
[11] https://drive.google.com/file/d/1aPl3etcnxby-45hc5H_FLGZtWRIqECCa/view?usp=drive_open
[12] https://drive.google.com/open?id=1ipF37k9IjhmNH-HbJkz_Vq2L7gPoeCcE
[13] https://drive.google.com/open?id=18TMreSIfm2hF5IwmCflvQfA4zTpjWXHt
[14] https://drive.google.com/open?id=1mI1Lm7J2vx3nXaG0156qLMa0Shhr940Z
[15] https://drive.google.com/open?id=1dJHNqZB_VQqU-iJ6qGf5PgSOOUJzmufW
[16] https://drive.google.com/open?id=1W-5yNKiEfW1nU3p91ATfbBCUqRcqJ-5I
[17] https://drive.google.com/open?id=1xog6jez1d5fhL6wBXjuco8OawnEOXkv5