

Dieuwke Hupkes

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EMPLOYMENT

ILLC, University of Amsterdam

Temporary lecturer

Amsterdam

January 2019 - present

ILLC, University of Amsterdam

PhD Student in the [Language in Interaction Consortium](#)

Amsterdam

July 2015 - January 2019

- Advisor: Dr. Willem Zuidema

Topic: Interpretability and hierarchical compositionality in neural networks

Facebook AI Research

Research Intern

Paris

January - April 2019

- Advisors: Diane Bouchacourt and Marco Baroni

Topic: Assessing compositionality of languages emerging in referential games

ILLC, University of Amsterdam

Research Assistant

Amsterdam

February 2014 - June 2015

- Under supervision of Dr. Willem Zuidema

Topic: Neural models of parsing

CREATE, University of Amsterdam

Pre-PhD fellowship

Amsterdam

February 2014 - June 2015

- Under supervision of Prof. Dr. Rens Bod

Topic: Part-of-Speech tagging of 17th century Dutch

EDUCATION

University of Amsterdam

Doctorate degree

Amsterdam

July 2015 - May 2020

University of Amsterdam

Master of Logic

Amsterdam

September 2011 - December 2013

University of Edinburgh

Exchange Semester

Edinburgh

Fall 2012

University of Amsterdam

Preparation year

Amsterdam

Sept 2010 - June 2011

University of Amsterdam

Bachelor of Science in Physics and Astronomy

Amsterdam

2006 - 2010

RESEARCH INTERESTS

- Computational and cognitive models of natural language processing
- Statistical parsing, syntax
- Hierarchy and compositionality in artificial neural networks
- Learning biases

- Neurocomputational models of language (processing)
- language emergence

TEACHING EXPERIENCE

As thesis supervisor.....

Jaap Jumelet – Msc Artificial Intelligence <i>The interpretability of neural language models</i>	Jan 2019 – now
Oskar van der Wal – Msc Artificial Intelligence <i>What can we learn from multi-agent referential games?</i>	Aug 2019 – now
Oscar Ligthart – Msc Artificial Intelligence <i>Consistency and structure in emergent languages</i>	Aug 2019 – now
Gautier Dagan – Msc Artificial Intelligence <i>Co-Evolution of Language and Agent in Referential Games</i>	Jan – Aug 2019
Dennis Ulmer – Msc Artificial Intelligence <i>Recoding latent sentence representations</i>	Jan – Aug 2019
Diana Rodriguez Luna – Msc Artificial Intelligence <i>Language emergence in multi-agent referential games</i>	Jan – July 2019
Kris Korrel – Msc Artificial Intelligence <i>From sequence to attention</i>	Jan – Nov 2018
Sanne Bouwmeester – Msc Artificial Intelligence <i>Analysing seq-to-seq models in goal oriented dialogue: generalising to disfluencies</i>	Jan – Oct 2018
Krstó Proroković – Master of Logic <i>Learning to decide a formal language: a recurrent neural network approach</i>	Jan – Nov 2018
Anand Kumar Singh – Msc Artificial Intelligence <i>Pondering in artificial neural networks</i>	Jan – Aug 2018
Ujjwal Sharma – Msc Artificial Intelligence <i>Interpreting decision-making in interactive visual dialogue</i>	Jan – Aug 2018
Rezka AUFAR Leonandya – Msc Artificial Intelligence <i>Learning to follow instructions</i>	Jan – Aug 2018
Lucas Weber – Msc Brain and Cognitive Science <i>Continual learning in humans and neuroscience-inspired AI</i>	Jan – Jun 2018
Philip Bouman – Bsc Artificial Intelligence <i>Modelling fonts with convolutional neural networks</i>	Jan – Aug 2018

As supervisor of individual or group projects.....

XAI: A conceptual framework for interpretability methods <i>Msc Brain and Cognitive Science student Lewis O’Sullivan</i>	Jun 2019 - now
The compositionality of neural networks <i>Msc AI students Verna Dankers and Mathijs Mul</i>	Jun 2018 - now
Syntactic Awareness in Language Models: Recurrence vs Self-Attention <i>Msc AI students Sander Bos, Lorian Colthof, Bryan Guevara and Vivian van Oijen</i>	Jun 2019
Unsupervised Grammar Induction in Emergent Languages <i>Msc AI students Silvan de Boer and Oskar van der Wal</i>	Jun 2019
On the Realisation of Compositionality in Neural Networks	Jun 2018

Msc AI students Joris Baan, Jana Leible, Mitja Nikolaus, David Rau, Verna Dankers, Santhosh Rajamanickam and Dennis Ulmer

Analysing Subject-Verb agreement with Diagnostic Classification Jun 2018

Msc AI students Mario Giulianelli, Jack Harding and Florian Mohnert

What do language models encode? Jun 2018

Msc AI student Jaap Jumelet

Learning compositionality in Neural Networks Jan 2018

Master of Logic students Federico Schiaffino, Haukur Pál Jónsson, Max Rapp, Flavio Tisi and Yuan-Ho Yao

Guest lectures.....

o **Statistical Methods for Natural Language Semantics** May 2019

o **Foundations of Neural and Cognitive Modelling** November 2018

o **Cognitive Models of Language and beyond** March 2018

o **Natural Language Processing 1** Dec 2017

o **Cognitive Models of Language and Music** Mar 2017

As teaching assistant.....

Natural Language Processing 1 Oct-Dec 2017

Msc Artificial Intelligence, Master of Logic

Computational Semantics and Pragmatics Sept-Oct 2016

Msc Artificial Intelligence, Master of Logic

Evolution of Language and Music Feb-Apr 2016, Oct-Dec 2016

Bsc Psychobiologie

Foundations of Neural and Cognitive Modelling Oct-Dec 2015

Msc Artificial Intelligence, Master of Logic, Msc Brain and Cognitive Science

Unsupervised Language Learning Feb-Apr 2014, Feb-Apr 2015

Msc Artificial Intelligence, Master of Logic

Automata and Formal Languages Apr-Jun 2013, Apr-Jun 2012

Bsc Artificial Intelligence

Biomechanics Feb-Jun 2013

Bsc bewegingswetenschappen (human motion sciences)

Logica Jan 2012, Jan 2013, Jan 2014

Bsc Beta Gamma

AWARDS AND FELLOWSHIPS

Research Internship January 2019

With Marco Baroni, at Facebook AI Research

Best Paper Award, BlackboxNLP 2018 August 2018

Under the Hood: Using Diagnostic Classifiers to Investigate and Improve how Language Models Track Agreement Information

Scholarship for Doctorate Studies June 2015

With Willem Zuidema, in the Language in Interaction Consortium

Pre-PhD fellowship June 2015

With Rens Bod, within CREATE

SERVICES

Organisation.....

Compositionality in Brains and Machines

Leiden

Workshop at the Lorentz workshop on compositionality

August 2019

Role: Lead organiser with Willem Zuidema and Marco Baroni. Tasks including writing workshop proposal, designing the workshop programme, inviting participants, being contact person for the Lorentz center and leading discussions during the workshop.

BlackboxNLP 2019 - Analyzing an interpreting Neural Networks

Florence

ACL workshop on analysing and interpreting neural networks

August 2019

Role: Co-organisation with Yonatan Belinkov, Grzegorz Chrupala and Tal Linzen. Tasks including sending out workshop calls, assigning reviewers, selecting papers, maintenance of workshop website and chairing sessions during the workshop.

Reviewing.....

- o TACL
- o BlackboxNLP 2019

Other.....

- o PhD council ILLC, University of Amsterdam
- o PhD council Faculty of Science, University of Amsterdam

TALKS & PANELS

- o *November 15, 2019.* Syntax in neural language models: a case study *University of Utrecht, Utrecht*
- o *October 9, 2019.* Subject verb agreement in neural language models – how, when and where? *Johns Hopkins University, Baltimore*
- o *October 1, 2019.* What do they learn? Neural networks, compositionality and interpretability. *Computational Cognition workshop, Osnabruek.*
- o *September 3, 2019.* Guest speaker and panelist at the public event When fake looks all too real: the technology behind Deep Fake, *SPUI25, Amsterdam.*
- o *August 1, 2019.* Blackbox NLP, **panel moderator.**
- o *June 18, 2019.* The typology of emergent languages. *Interaction and the Evolution of Linguistic Complexity, Edinburgh.*
- o *May 6.* The compositionality of neural networks: integrating symbolism and connectionism. *CS&AI / SIKS workshop on analyzing and interpreting neural networks for NLP, 's-Hertogenbosch.*
- o *April 18.* The compositionality of neural networks: integrating symbolism and connectionism. *Invited internal talk at Saarland University, Saarbrücken.*
- o *March 14.* On neural networks and compositionality. *Invited internal seminar at École normale supérieure, Paris.*
- o *July 18, 2018.* Visualisation and ‘diagnostic classifiers’ reveal how recurrent and recursive neural networks process hierarchical structure. *IJCAI, Stockholm.*
- o *June 12, 2018.* Learning compositionally through attentive guidance. *Invited internal seminar at the University of Copenhagen.*
- o *May 9, 2017.* Processing hierarchical structure with RNNs. *Dagstuhl seminar on Human-like neural-*

symbolic computing.

- December 7, 2017. The grammar of neural networks. *SMART workshop Grammars, Computation & Cognition, Amsterdam.*
- December 15, 2017. Hierarchical compositionality in recurrent neural networks. *Invited internal seminar at Rijksuniversiteit Groningen.*
- May 25, 2016. POS-tagging of Historical Dutch. *LREC, Portoroz.*
- November 22, 2016. How may neural networks process hierarchical structure? Insights from recursive and recurrent networks learning arithmetics. *Logic Tea at the University of Amsterdam.*
- June 8, 2015 Using Parallel Data to improve Part-of-Speech tagging of 17th century Dutch. *DH Benelux, Antwerp.*

PUBLICATIONS

- Hupkes D., Rodriguez Luna D., Ponti E.M. and Bruni E. Internal and External Pressures on Language Emergence: Least Effort, Object Constancy and Frequency. *In prep.*
- Dagan, G., Hupkes, D. and Bruni E. Co-evolution of language and agent. *In prep.*
- Hupkes D., Dankers V., Mul M. and Bruni E. [The compositionality of neural networks: integrating symbolism and connectionism.](#) *Accepted for publication in JAIR.*
- Jumelet J., Zuidema W. and Hupkes D. (2019). [Analysing Neural Language Models: Contextual Decomposition Reveals Default Reasoning in Number and Gender Assignment.](#) *CONLL 2019.*
- Baan J., Leible J., Nikolaus M., Rau D., Ulmer D., Baumgärtner T., Hupkes D. and Bruni E. (2019). [On the Realization of Compositionality in Neural Networks.](#) *BlackboxNLP, ACL 2019.*
- Ulmer D., Hupkes, D. and Bruni, E (2019). [Assessing incrementality in sequence-to-sequence models.](#) *Repl4NLP, ACL 2019.*
- Korrel K., Hupkes D., Dankers V., and Bruni E. (2019) [Transcoding compositionally: using attention to find more generalizable solutions.](#) *BlackboxNLP, ACL 2019.*
- Lakretz Y., Kruszewski G., Desbordes T., Hupkes D., Dehaene S. and Baroni M. (2019) [The emergence of number and syntax units in LSTM language models.](#) *NAACL 2019.*
- Hupkes D., Singh A.K., Korrel K., Kruszewski G. and, Bruni E (2019). [Learning compositionally through attentive guidance.](#) *CICLing 2019.*
- Leonandya R., Bruni E., Hupkes D. and Kruszewski G (2019). [The Fast and the Flexible: training neural networks to learn to follow instructions from small data.](#) *IWCS.*
- Hupkes D., Veldhoen S., and Zuidema W. (2018). [Visualisation and ‘diagnostic classifiers’ reveal how recurrent and recursive neural networks process hierarchical structure.](#) *Journal of Artificial Intelligence Research.*
- Giulianelli, M., Harding, J., Mohnert, F., Hupkes, D. and Zuidema, W. (2018). [Under the hood: using diagnostic classifiers to investigate and improve how language models track agreement information.](#) *BlackboxNLP 2018, ACL.*
Best paper award.
- Zuidema W., Hupkes D., Wiggins G., Scharf C. and Rohrmeier M. (2018). [Formal models of Structure Building in Music, Language and Animal Song.](#) In *The Origins of Musicality.*
- Jumelet, J. and Hupkes, D. (2018). [Do language models understand anything? On the ability of LSTMs to understand negative polarity items.](#) *BlackboxNLP 2018, ACL.*

- Hupkes, D., Bouwmeester, S. and Fernández, R. (2018). [Analysing the potential of seq2seq models for incremental interpretation in task-oriented dialogue](#). *BlackboxNLP 2018, ACL*.
- Hupkes D. and Zuidema W. (2017) [Diagnostic classification and symbolic guidance to understand and improve recurrent neural networks](#). *Interpreting, Explaining and Visualizing Deep Learning, NIPS2017*.
- Veldhoen S., Hupkes D. and Zuidema W. (2016). [Diagnostic Classifiers: Revealing how Neural Networks Process Hierarchical Structure](#). *Cognitive Computation: Integrating Neural and Symbolic Approaches, NIPS2016*.
- Hupkes D. and Bod R (2016) [POS-tagging of Historical Dutch](#). *LREC2016*.

LANGUAGES

DUTCH:	Mothertongue	FRENCH:	Basic Knowledge
ENGLISH:	Fluent	RUSSIAN:	Basic Knowledge
ITALIAN:	Good command	GERMAN:	Basic Knowledge
SPANISH	Basic command	FRYSIAN:	Understanding

ET CETERA

I'm part of a competitive pole dance duo, we participated twice in the national championships, placing 1st and 2nd. In 2018, we also participated in the World Championship and arrived at place 10 of the world ranking. https://instagram.com/duo_polenotti.