Edward Grefenstette

London, United Kingdom

Employment

Director of Research, Google DeepMind, London, June 2023 – Present.
Honorary Professor of UCL, UCL, London, March 2021 – Present.
Fellow, European Lab for Learning and Intelligent Systems (ELLIS), December 2020 – Present.
Head of Machine Learning, Cohere, London, April 2022 – June 2023.
Research Scientist, Facebook, December 2018 – March 2022.
Honorary Associate Professor, UCL, London, January 2018 – March 2021.
Staff Research Scientist, DeepMind, London, June 2017 – December 2018.
Senior Research Scientist, DeepMind, London, November 2014 – May 2017.
CTO and Co-Founder, Dark Blue Labs, London, April 2014 – October 2014.
Fulford Junior Research Fellow, Somerville College, Oxford, October 2013. – September 2015.
Postdoctoral Research Assistant, Department of Computer Science, University of Oxford, October 2012 – September 2014.

Education

DPhil (PhD) Computer Science, Balliol College, University of Oxford, Examined June 2013.
- Thesis: "Category-Theoretic Quantitative Compositional Distributional Models of Natural Language Semantics".
- Supervised by Stephen Pulman, Bob Coecke and Mehrnoosh Sadrzadeh.
- Examined by Samson Abramsky and Shalom Lappin. Passed with minor corrections.

MSc Computer Science, *Distinction*, Balliol College, University of Oxford, September 2009.
- Dissertation: "Analysing Document Similarity Measures", supervised by Stephen Pulman.

MLitt Philosophy, University of St. Andrews, September 2008.
- Thesis: "Reviving Mathematical Intuition: Steps Towards a 'Neo-Poincaréan' Philosophy of Mathematics", supervised by Peter Clark.

BSc Physics and Philosophy, *1st Class Honours*, University of Sheffield, July 2007.
- Autumn Dissertation: "On an instrumentalist reading of Hilbert: a critique of Detlefsen", supervised by Bob Hale.
- Spring Dissertation: "Does Blackburn's quasi-realism threaten the foundations of Wright's minimalism?", supervised by Andrew Howat.
- Final year Physics Research Project: Designed a 10-lecture course on Quantum Computing.
- Final year Physics Research Paper: "Is String Theory Science?"

Baccalauréat OIB Série S, CSI Europole, International High School, September 2003.

Scholarships, Prizes & Grants

IJCAI-JAIR Best Paper Prize, awarded for "Learning Explanatory Rules from Noisy Data" (joint work with R. Evans), 2021.
***SEM 2013 Best Long Paper Award**, awarded for the single-author paper "Towards a Formal Distributional Semantics: Simulating Logical Calculi with Tensors", June 2013.
Westerman Eastern Pathfinders Award, awarded by Balliol College, Oxford, May 2013.
Enhanced EPSRC Stipend, awarded by Oxford University Computing Laboratory, October 2010.

Books

Heunen, C., Sadrzadeh, M. and Grefenstette, E. (eds.) *Quantum physics and linguistics: a compositional, diagrammatic discourse*, Oxford University Press, February 2013.

Journal Articles

Evans, R. and Grefenstette, E., Learning Explanatory Rules from Noisy Data, *Journal of Artificial Intelligence Research*, 2018.

Kocisky, T., Schwarz, J., Blunsom, P., Dyer, C., Hermann, K.M., Melis, G. and Grefenstette, E., The NarrativeQA Reading Comprehension Challenge, upcoming in *Transactions of the Association for Computational Linguistics*, 2017.

Graves, A., Wayne, G., Reynolds, M., Harley, T., Danihelka, I., Grabska-Barwińska, A., Gómez Colmenarejo, S., Grefenstette, E., Ramalho, T., Agapiou, J., Puigdomènech Badia, A., Hermann, K.M., Zwols, Y., Ostrovski, G., Cain, A., King, H., Summerfield, C., Blunsom, P., Kavukcuoglu, K. and Hassabis, D., Hybrid Computing Using a Neural Network with Dynamic External Memory, *Nature*, 2016.

Grefenstette, E. and Sadrzadeh, M., Concrete Models and Empirical Evaluations for the Categorical Compositional Distributional Model of Meaning, *Computational Linguistics*, 2015.

Coecke, B., Grefenstette, E. and Sadrzadeh, M., Lambek vs. Lambek: Functorial Vector Space Semantics and String Diagrams for Lambek Calculus, *Annals of Pure and Applied Logic*, 2013.

Sadrzadeh, M. and Grefenstette, E., A Compositional Distributional Semantics, Two Concrete Constructions, and some Experimental Evaluations, *Lecture Notes in Computer Science: Quantum Interaction*, Springer, 2011.

Book Chapters

Clark, S., Coecke, B., Grefenstette, E., Pulman, S. and Sadrzadeh, S., A quantum teleportation inspired algorithm produces sentence meaning from word meaning and grammatical structure, `arXiv:1305.0556`, to appear in Springer volume, expected 2014.

Grefenstette, E., Sadrzadeh, M., Clark, S., Coecke, B. and Pulman, S., Concrete Compositional Sentence Spaces, *Computing Meaning, Vol. 4* (Bunt, H., Bos, J. and Pulman, S. eds.), Springer, 2013.

Refereed Conference/Workshop Papers

See `https://scholar.google.com/citations?hl=en&user=ezllEwMAAAAJ` *for publications from 2021 onwards.*

Campero, A., Raileanu, R., Küttler, H., Tenenbaum, J.B., Rocktäschel, T., and Grefenstette, E., Learning with AMIGo: Adversarially Motivated Intrinsic Goals, *The 8th International Conference on Learning Representations*, 2021.

Bechtle, S., Molchanov, A., Chebotar, Y., Grefenstette, E., Righetti, L., Sukhatme, G. and Meier, F., Meta Learning via Learned Loss, *Proceedings of the 25th International Conference on Pattern Recognition*, 2020.

Htut, P., Marschall, O., Bowman, S., Kiela, D., Grefenstette, E., Savin, C. and Cho, K., Online Hyperparameter Tuning for Multi-Task Learning, *Proceedings of the ICML 2020 Workshop on Continual Learning*, 2020.

Minervini, P., Riedel, S., Stenetorp, P., Grefenstette, E. and Rocktäschel, T., Learning Reasoning Strategies in End-to-End Differentiable Proving, *Proceedings of ICML*, 2020.

Zhong, V., Rocktäschel, T. and Grefenstette, E., RTFM: Generalising to Novel Environment

Dynamics via Reading, *The 7th International Conference on Learning Representations*, 2020.

Minervini, P., Bošnjak, M., Rocktäschel, T., Riedel, S. and Grefenstette, E., Differentiable Reasoning on Large Knowledge Bases and Natural Language, *Proceedings of The Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI-20)*, 2020.

Luketina, J., Nardelli, N., Farquhar, G., Foerster, J., Andreas, J., Grefenstette, E., Whiteson, S. and Rocktäschel, T., A Survey of Reinforcement Learning Informed by Natural Language, *The 28th International Joint Conference on Artificial Intelligence*, 2019.

Wang, C., Bunel, R., Dvijotham, K., Huang, P., Grefenstette, E. and Kohli, P., Knowing When to Stop: Evaluation and Verification of Conformity to Output-size Specs, *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2019.

Bahdanau, D., Hill, F., Leike, J., Hughes, E., Hosseini, A., Kohli, P. and Grefenstette, E., Learning to Understand Goal Specifications by Modelling Reward, *The 6th International Conference on Learning Representations*, 2019.

Saxton, D., Grefenstette, E., Hill, F. and Kohli, P., Analysing Mathematical Reasoning Abilities of Neural Models, *The 6th International Conference on Learning Representations*, 2019.

Evans, R., Saxton, D., Amos, D., Kohli, P. and Grefenstette, E., Can Neural Networks Understand Logical Entailment?, *The 5th International Conference on Learning Representations*, 2018.

Miao, Y., Grefenstette, E., Blunsom, P., Discovering Discrete Latent Topics with Neural Variational Inference, *Proceedings of ICML*, 2017.

Yogatama, D., Blunsom, P., Dyer, C., Grefenstette, E., Ling, W., Learning to Compose Words into Sentences with Reinforcement Learning, *The 4th International Conference on Learning Representations*, 2017.

Yu, L., Blunsom, P., Dyer, C., Grefenstette, E. and Kocisky, T., The Neural Noisy Channel, *The 4th International Conference on Learning Representations*, 2017.

Kočiský, T., Melis, G., Grefenstette, E., Dyer, C., Ling, W., Blunsom, P., Hermann, K.M., Semantic Parsing with Semi-Supervised Sequential Autoencoders, *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing*, 2016.

Ling, W., Grefenstette, E., Hermann, K.M., Kočiský, T., Senior, A., Wang, F. and Blunsom, P., Latent Predictor Networks For Code Generation, *Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics*, 2016.

Rocktäschel, T., Grefenstette, E., Hermann, K.M., Kočiský, T. and Blunsom P., Reasoning about Entailment with Neural Attention, *The 3rd International Conference on Learning Representations*, 2016.

Grefenstette, E. Hermann, K.M., Suleyman, M. and Blunsom P., Learning to Transduce with Unbounded Memory, *Advances in Neural Information Processing Systems*, 2015.

Hermann, K.M., Kocisky, T., Grefenstette, E., Espeholt, L., Kay, W., Suleyman, M. and Blunsom, P., Teaching Machines to Read and Comprehend, *Advances in Neural Information Processing Systems*, 2015.

Cheng, J., Kartsaklis, D. and Grefenstette, E., Investigating the Role of Prior Disambiguation in Deep-Learning Compositional Models of Meaning, *Proceedings of the 2014 NIPS Workshop on Learning Semantics*, 2014.

Grefenstette, E., Blunsom, P., de Freitas, N. and Hermann, K.M., A Deep Architecture for Semantic Parsing, *Proceedings of the ACL 2014 Workshop on Semantic Parsing*, 2014.

Kalchbrenner, N., Grefenstette, E. and Blunsom, P., A Convolutional Neural Network for Modelling Sentences, *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics*, 2014.

Maillard, J., Clark, S. and Grefenstette, E., A Type-Driven Tensor-Based Semantics for CCG, *EACL 2014 Type Theory and Natural Language Semantics Workshop*, 2014.

Hermann, K. M., Grefenstette, E. and Blunsom, P., "Not not bad" is not "bad": A distributional account of negation, *Proceedings of the 2013 Workshop on Continuous Vector Space Models and their Compositionality*, 2013.

Grefenstette, E., Towards a Formal Distributional Semantics: Simulating Logical Calculi with Tensors, *Proceedings of the Second Joint Conference on Lexical and Computational Semantics*, 2013.

Grefenstette, E., Dinu, G., Zhang, Y., Sadrzadeh, M., and Baroni, M., Multi-Step Regression Learning for Compositional Distributional Semantics, *Proceedings of the 10th International Conference on Computational Semantics (IWCS 2013)*, 2013.

Grefenstette, E. and Sadrzadeh, M., Experimenting with transitive verbs in a DisCoCat, *Proceedings of the GEMS 2011 Workshop on GEometrical Models of Natural Language Semantics*, 2011.

Grefenstette, E. and Sadrzadeh, M., Experimental Support for a Categorical Compositional Distributional Model of Meaning, *Proceedings of the 2011 Conference on Empirical Methods in Natural Language Processing*, 2011.

Grefenstette, E., Sadrzadeh, M., Clark, S., Coecke, B., and Pulman, S., Concrete Sentence Spaces for Compositional Distributional Models of Meaning, *Proceedings of the 9th International Conference on Computational Semantics (IWCS 2011)*, 2011.

Patents

Danihelka, I., Wayne, G., Wang, F., Grefenstette, E., Rae, J., Graves, A., Lillicrap, T., Harley, T. and Hunt, J., Augmenting neural networks with sparsely-accessed external memory, *US 20170228638 A1*.

Grefenstette, E. Hermann, K.M., Suleyman, M. and Blunsom P., Augmented Neural Networks, *US 20160358071 A1*.

Hermann, K.M., Kocisky, T., Grefenstette, E., Espeholt, L., Kay, W., Suleyman, M. and Blunsom, P., Reading Comprehension Neural Networks, *US 20160358072 A1*.

Selected Invited Talks

CIKM Keynote, CIKM'18, "Teaching Artificial Agents to Understand Language by Modelling Reward," 24 October, 2018.

"Language and Big Data" Debate, ICPS'17, Position Statement: "How much linguistics is needed for NLP?," 24 March, 2017.

CAIRE Seminar, HKUST, "Learning to Follow Grounded Language Instructions in the "Real" World," 13 July, 2018.

CSML Seminar, UCL, "Learning to Follow Grounded Language Instructions in the "Real" World," 8 June, 2018.

Logic and Learning Workshop, Turing Institute, "Recurrent Neural Networks and Models of Computation," January 11, 2018.

Neural Abstract Machines & Program Induction, NIPS Workshop, "Limitations of RNNs: A Computational Perspective," December 10, 2016.

Harvard NLP Seminar, "How Much Linguistics is Needed for NLP?," March 14, 2016.

MIT CSAIL Seminar, "How Much Linguistics is Needed for NLP?," March 10, 2016.

UCL South England Natural Language Processing Meetup, "How Much Linguistics is Needed for NLP?," November 26, 2015.

Cambridge NLIP Seminar, "How Much Linguistics is Needed for NLP?," November 6, 2015.

Edinburgh ILCC Seminar, "How Much Linguistics is Needed for NLP?," October 23, 2015.

Oxford Christmas Science Lectures, Oxford University, Oxford, "Can Machines Think?," December 11, 2013.

Departmental Seminar, HKUST, Hong Kong, "Quantum Information Flow made Classical: New Mathematics for Natural Language Compositionality," September 2nd, 2013.

CQT Seminar, National University of Singapore, Singapore, "From Quantum Teleportation to Neural Tensor Networks," August 28th, 2013.

Departmental Seminar, School of Computer Science, Carnegie Mellon University, Pittsburgh, "Categories, Vectors and Tensors, Oh My!: Pure Mathematics Meets Machine Learning," August 15th, 2013.

Tutorials and Summer Schools

ACL 2017 Tutorial, *Deep Learning for Semantic Composition,* with Xiaodan Zhu, July 30, 2017.
Montreal Deep Learning Summer School, *Beyond Seq2Seq with Augmented RNNs,* August 4, 2016.
ACL 2014 Tutorial, *New Directions in Vector Space Models of Meaning,* with Phil Blunsom, Karl Moritz Hermann, Georgiana Dinu, June 22, 2014.

Students

Matko Bosnjak, *On Differentiable Interpreters,* PhD Computer Science, University College London, *expected 2019.*

Jianpeng Cheng, *Investigating the Role of Prior Disambiguation in Deep-learning Compositional Models of Meaning,* MSc Computer Science, University of Oxford, 2014.

Wenjie Guan, *Theory of and Applications for Log-Bilinear Models,* MSc Computer Science, University of Oxford, 2014.

Conference Organisation & Professional Activities

Standing Senior Organising Committee, SIGREP, 2018–Present.
Area Chair, ACL 2020.
Area Chair and Best Paper Award Committee, ICLR 2020.
Area Chair, NeurIPS 2019.
Area Chair, Sentence-level Semantics, ACL 2019.
Area Chair, ICLR 2019.
Area Chair, NIPS 2018.
Senior Workshop Committee, 3rd Workshop on Representation Learning for NLP at ACL 2018, July 20, 2018.
Area Chair, ICLR 2018.
Area Chair, Semantics, EMNLP 2017.
Workshop Organiser, 2nd Workshop on Representation Learning for NLP at ACL 2017, August 3, 2017.
Area Chair, ICLR 2017.
Area Chair, Semantics, EMNLP 2016.
Area Chair, Machine Learning, ACL 2016.
Workshop Organiser, 1st Workshop on Representation Learning for NLP at ACL 2016, August 11, 2016.
Workshop Organiser, 3rd Workshop on Continuous Vector Space Models and their Compositionality at ACL 2015, July 31, 2015.
Area Chair, Distributional Semantics, *SEM 2015.
Workshop Organiser, 2nd Workshop on Continuous Vector Space Models and their Compositionality at EACL 2014, April 27, 2014.

Reviewing

Journal Reviewing: Transactions of the Association for Computational Linguistics; Journal of Artificial Intelligence Research; International Journal of Computer Mathematics; Computational Linguistics; Journal of Logic, Language and Information (JoLLI); Language and Linguistics Compass.

Programme Committees: ICML 2015, NAACL 2015, IWCS 2015, WOOT14 (USENIX), EMNLP 2014, ACL 2014, EACL 2014, IJCNLP 2013 (Syntax and Semantics), *SEM 2013 (Morphology and Semantics), *SEM 2013 (Sentence-level Semantic Processing), ACL 2013 (Student Workshops), NAACL 2013 (Semantics), IWCS 2013, TFDS (IWCS Workshop) 2013, *SEM 2012, EACL 2011 (Semantics).

Reviewer, "Doing Philosophy: A Practical Guide for Students", Higher Education Academy PRS Subject Centre, Continuum Press, April 2008.

Teaching

Lecturer, Formal Foundations of Linguistics, Oxford University Faculty of Linguistics, Philology and Phonetics, October 2013 – December 2013.

Lecturer, Computational Linguistics, Oxford University Department of Computer Science (DCS), January 2013 – April 2013.

College Tutor, Discrete Mathematics, Probability, Functional Programming, Design and Analysis of Algorithms, Hertford College, Oxford, October 2012 – Present.

Practical Demonstrator, Information Retrieval, Oxford University DCS, January 2011 – December 2012.

Class Tutor, Computational Linguistics, Oxford University DCS, October 2011 – December 2011.

Practical Demonstrator, Intelligent Systems, Oxford University DCS, October 2011 – December 2011.

Class Tutor, Information Retrieval, Oxford University Computing Laboratory (OUCL), January 2011 – April 2011.

Practical Demonstrator, Reasoning about Information Update, OUCL, January 2011 – April 2011.

College Tutor, Object-Oriented Programming, Balliol College, Oxford, October 2010 – December 2010.

Class Tutor, Computational Linguistics, OUCL, October 2010 – December 2010.

Teaching Assistant, Information Retrieval, OUCL, January 2010 – March 2010.

Practical Demonstrator, Intelligent Systems II, OUCL, January 2010 – March 2010.

Private Tutor, PPE Prelim Formal Logic. Oxford, United Kingdom, April 2009 – July 2009.

English Language Teacher, Kokusai Eiken Center, International School of Sacred Heart, Tokyo, Japan, July 2007 – August 2007.

Private Tutor, French, Mathematics. Sheffield, United Kingdom, November 2004 – July 2006.

Assistant English Language Teacher, Kokusai Eiken Center, St. Mary's International School, Tokyo, Japan, July 2003 – August 2003 and July 2005 – August 2005.

Programming

- Proficient in C, C++, Python.
- Working knowledge of Java, Haskell, MATLAB, Scala.

Personal

US & French, and British Citizen.

Fluent in French & English. Some knowledge of Italian (5 years) and Japanese (2 years).

Latest revision: June 12, 2023.