Michael **Schlichtkrull**

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About Me

I am a lecturer in Computer Science at the School of Electronic Engineering and Computer Science, Queen Mary University of London. I work primarily on automated evidential reasoning using natural language processing. My research interests and publication history span knowledge-intensive NLP, graph neural networks, explainable AI, evaluation of AI systems, and the philosophy of AI with a focus on epistemology and ethics.

My research focuses on machine learning as applied to large data sources, such as knowledge bases, Wikipedia, or the open web. I am especially interested in the foundational challenge of how to extract insights from *untrustworthy* sources with machine learning. I aim to investigate and develop explainable, computationally feasible, and epistemically responsible processes for such data.

Work Experience

Lecturer in Computer Science (Teaching & Research)
London, United Kingdom

Queen Mary University of London
January 2024 - Present

- Ongoing appointment at Queen Mary, University of London
- Academic research on automated source criticism, fact-checking, and reasoning with NLP.
- Module organiser for the course IOT7005P Risk and Decision Making with Artificial Intelligence.
- Co-organizing a UK AI Fringe event on *Computational Journalism & Misinformation in the Generative AI Era*.

Postdoctoral Research Associate & Affiliated Lecturer
Cambridge, United Kingdom

University of Cambridge
March 2021 - January 2024

- Research position at the University of Cambridge, working with Andreas Vlachos on automated fact-checking.
- Worked on a breadth of problems including dataset collection, evaluation, modelling, and epistemology.
- Multiple publications at top venues, including the AVeriTeC dataset at NeurIPS 2023.
- Cosupervising students at PhD, MPhil, and undergraduate level.
- Gave lectures on generative modeling, focusing on summarization, in the course L90 Natural Language Processing.
- Worked as a co-organizer for the FEVER 2021, 2022, and 2023 workshops at EMNLP 2021, ACL 2022, and EACL 2023 respectively.

Research Intern
London, United Kingdom

Facebook AI Research
June 2020 - September 2020

- Research internship in NLP at FAIR London, working mainly with Mike Lewis and Sebastian Riedel.
- Investigation into and development of a system for fact-checking over large open collections of tabular data, resulting in an ACL publication.

Applied Science Intern
Berlin, Germany

Amazon
July 2018 - September 2018

- Research internship in NLP at Amazon Berlin, working mainly with Weiwei Cheng and Alex Klementiev.
- Development of systems and evaluation practices for question generation over natural text.

Student Assistant in IT Development
Copenhagen, Denmark

Saxo.com ApS
June 2014 - June 2016

- Development of server-side software for online booksales, working mainly in C# and SQL.
- Implementation and exposure of functionalities through a public API, as well as occasional front-end work.

Teaching Assistant for Algorithms and Data Structures I & II
Copenhagen, Denmark

Technical University of Denmark
February 2012 - December 2012

- Exercise sessions and homework grading for Algorithms and Data Structures I, taught by Inge Li Gøtz. Introductory material including sorting, searching, heaps, trees, and elementary graph theory.
- Exercise sessions for Algorithms and Data Structures II, taught by Paul Fischer. Higher-level material including flow algorithms, balanced data structures, and graph partitioning.

Education

PhD in Computer Science

Amsterdam, Netherlands & Edinburgh, United Kingdom

University of Amsterdam — *Sep 2016 - June 2021*

- PhD topic was the use of graph-neural networks to model structured data for natural language processing. Advised by Ivan Titov.
- Introduced the first graph neural network models for relational data, resulting in a highly cited publication on link prediction.
- Built subsequent applications of graph neural networks to knowledge base question answering and other NLP tasks.
- Developed advanced techniques for using and interpreting graph neural networks.
- While formally at the University of Amsterdam, worked as a permanent visitor at the University of Edinburgh for most of the PhD.

Master of Science in IT and Cognition

Copenhagen, Denmark

University of Copenhagen — *Sep 2014 - Aug 2016*

- Thesis subject was cross-lingual dependency parsing for truly low-resource languages, supervised by Anders Søgaard. My work resulted in state-of-the-art performance as well as a publication at EACL.
- The programme was offered by the Center for Language Technology, and approaches language processing as an interdisciplinary field involving mathematics, machine learning, and knowledge from linguistics and cognitive science.
- Courses in natural language processing, statistical machine learning, probabilistic modelling, and image processing, with a secondary focus on cognitive science.

Bachelor of Science in Software Engineering

Copenhagen, Denmark

Technical University of Denmark — *Sep 2010 - Jul 2013*

- Thesis subject was coreference resolution in semantic parsing, using a formal logical approach based on type theory. My supervisor was Jørgen Villadsen.
- Courses in mathematics, probability theory, graph theory, algorithms, formal logic, and computer science modelling.

Grants

FEVER-IT Co-investigator with collaborators from Cambridge on the Alan Turing Institute / DSO National Laboratories Partnership grant FEVER-IT, where we have been awarded £350,000 for the modelling of multimodal misinformation.

AdSolve Co-investigator with collaborators from Queen Mary University of London, University of Sheffield, and University of Warwick on the Responsible AI UK Keystone grant AdSolve, where we have been awarded £4.38 million for addressing the sociotechnical limitations of large language models.

AutoSourC Principal Investigator on a New Investigator Award submission (under review), requesting £490,000 for the development of NLP methods to automate and assist source criticism.

Supervision & Teaching

IOT7005P Risk and Decision Making with Artificial Intelligence I am currently module organizer for this degree apprenticeship course at Queen Mary, University of London. The course covers an introduction to probability and Bayes' theorem, reasoning with Bayesian networks and influence diagram, and a part on causal reasoning.

L90 Natural Language Processing Co-taught with Weiwei Sun at the University of Cambridge. The course covers a general introduction to NLP, intended for third-year undergraduates as well as MPhil students. My part was on generative models, focusing on summarization.

Eric Chamoun I am currently co-supervising Eric Chamoun's PhD research together with Andreas Vlachos. His topic is automated fact-checking for scientific claims, focusing on the use of peer reviews as data for fact-checking models.

Mubashara Akhtar I co-supervised Mubashara Akhtar's project as a visiting PhD researcher at Cambridge, together with Andreas Vlachos. Her topic was evaluation of evidence retrieval for automated fact-checking.

Xuyou Cheng In 2022 I acted as the primary supervisor for Xuyou Cheng on his master's dissertation. His topic was to model lexical semantics with graph convolutional networks, exploring whether knowledge can transfer from knowledge base modelling to classical semantic tasks. A paper based on the thesis was published at EMNLP 2023.

Andrew Georgiou In 2022 I co-supervised Andrew Georgiou on his master's dissertation together with Zhijiang Guo and Andreas Vlachos. His topic was to edit the knowledge contained in language models, in order to improve their factuality on fact-checking tasks.

Undergraduate students @ QMUL I am currently supervising four undergraduate dissertations at Queen Mary. Topics include mitigating hallucinations in LLMs, tool-use in LLMs, finance-domain fact-checking, and machine translation for sign language.

Undergraduate students @ Cambridge In 2022 and 2023 I co-supervised two undergraduate dissertations at Cambridge. Topics included automatically generated adversarial attacks against fact-checking models, and fact-checking over tables.

Pembroke Summer School I participated as a superviser in the summer school at Pembroke College, Cambridge, supervising undergraduate students for a six week period. Projects I supervised included graph neural networks for autonomous public transport, and large language models for education.

Events, Activities, & Outreach

Fact Extraction and VERification (FEVER) workshop Co-organized three editions of the workshop (2021, 2022, 2023, 2024), including two shared tasks.

***Media in the digital age* Alan Turing interest group** Supporting member of the special interest group and co-organizer of the affiliated Mediate 2024 workshop at the AI UK Fringe.

UKRI Inter AI CDT Conference 2023 Gave an invited talk on the creation and evaluation of real-world applicable automated fact-checking artefacts.

Oxford ICTF 2023 Conference Gave an invited talk on automated fact-checking and the possibility of deriving truth from large language models.

Cambridge Science Festival 2023 Presented a demo of a fact-checking system to a lay audience.

Media Attention Interviewed on subjects related to my work on two occasions, for WIRED (`https://www.wired.co.uk/article/fact-checkers-ai-chatgpt-misinformation`) and the Washington Post (`https://www.washingtonpost.com/technology/2023/04/06/chatgpt-australia-mayor-lawsuit-lies/`).

EACL Student Board Member Served as a student board member from 2017-2020. Participated in organization, including of the Student Research Workshop. Wrote the code for the current website, `https://eacl.org/`.

Other Activities Area chair at EMNLP, action editor at ARR. Reviewing at ACL, EMNLP, EACL, NeurIPS, AAAI, ICLR, IJCAI, Neural Networks, Dialogue and Discourse, Journal of Natural Language Engineering, Journal of Intelligent and Fuzzy System.

Publications

Generating Media Background Checks for Automated Source Critical Reasoning Michael Schlichtkrull. 2024. Published to *ArXiv*, under review at *EMNLP 2024*.

Document-level Claim Extraction and Decontextualisation for Fact-Checking Zhenyun Deng, Michael Schlichtkrull, and Andreas Vlachos. 2024. Published at *ACL 2024*.

Automated Focused Feedback Generation for Scientific Writing Assistance Eric Chamoun, Michael Schlichtkrull, and Andreas Vlachos. 2024. Published in *Findings of ACL 2024*.

AVeriTeC: A Dataset for Real-world Claim Verification with Evidence from the Web Michael Schlichtkrull*, Zhijiang Guo*, and Andreas Vlachos. * denotes equal contribution. 2023. Published at *NeurIPS 2023*.

Are Embedded Potatoes Still Vegetables? On the Limitations of WordNet Embeddings for Lexical Semantics Xuyou Cheng, Michael Schlichtkrull, Guy Emerson. 2023. Published at *EMNLP 2023*.

The Intended Uses of Automated Fact-Checking Artefacts: Why, How and Who Michael Schlichtkrull, Nedjma Ousidhoum, and Andreas Vlachos. 2023. Published in *Findings of EMNLP 2023*.

Multimodal Automated Fact-Checking: A Survey Mubashara Akhtar, Michael Schlichtkrull, Zhijiang Guo, Oana Cocarascu, Elena Simperl, Andreas Vlachos. 2023. Published in *Findings of EMNLP 2023*.

A Survey on Automated Fact-checking Zhijiang Guo*, Michael Schlichtkrull*, and Andreas Vlachos. * denotes equal contribution. 2022. In *TACL*, presented at *ACL 2022*.

Unik-QA: Unified Representations of Structured and Unstructured Knowledge for Open-domain Question Answering Barlas Oguz, Xilun Chen, Vladimir Karpukhin, Stan Peshterliev, Dmytro Okhonko, Michael Sejr Schlichtkrull, Sonal Gupta, Yashar Mehdad, and Scott Yih. 2022. In *Findings of NAACL 2022*.

FEVEROUS: Fact Extraction and VERification Over Unstructured and Structured information Rami Aly, Zhijiang Guo, Michael Sejr Schlichtkrull, James Thorne, Andreas Vlachos, Christos Christodoulopoulos, Oana Cocarascu, and Arpit Mittal. 2021. In *NeurIPS 2021*.

Incorporating Structure into Neural Models for Language Processing Michael Sejr Schlichtkrull. 2021. PhD Thesis, published at the *University of Amsterdam*.

Joint Verification and Reranking for Open Fact Checking Over Tables Michael Sejr Schlichtkrull, Vladimir Karpukhin, Barlas Oğuz, Mike Lewis, Wen-tau Yih, and Sebastian Riedel 2021. In *ACL 2021*.

Interpreting Graph Neural Networks for NLP With Differentiable Edge Masking Michael Sejr Schlichtkrull, Nicola De Cao, and Ivan Titov. 2021. In *ICLR 2021*.

Neurips 2020 EfficientQA competition: Systems, analyses and lessons learned Sewon Min, Jordan Boyd-Graber, Chris Alberti, Danqi Chen, Eunsol Choi, Michael Collins, Kelvin Guu, Hannaneh Hajishirzi, Kenton Lee, Jennimaria Palomaki, Colin Raffel, Adam Roberts, Tom Kwiatkowski, Patrick Lewis, Yuxiang Wu, Heinrich Küttler, Linqing Liu, Pasquale Minervini, Pontus Stenetorp, Sebastian Riedel, Sohee Yang, Minjoon Seo, Gautier Izacard, Fabio Petroni, Lucas Hosseini, Nicola De Cao, Edouard Grave, Ikuya Yamada, Sonse Shimaoka, Masatoshi Suzuki, Shumpei Miyawaki, Shun Sato, Ryo Takahashi, Jun Suzuki, Martin Fajcik, Martin Docekal, Karel Ondrej, Pavel Smrz, Hao Cheng, Yelong Shen, Xiaodong Liu, Pengcheng He, Weizhu Chen, Jianfeng Gao, Barlas Oguz, Xilun Chen, Vladimir Karpukhin, Stan Peshterliev, Dmytro Okhonko, Michael Sejr Schlichtkrull, Sonal Gupta, Yashar Mehdad, and Wen-tau Yih. 2020. In *NeurIPS 2020 Competition and Demonstration Track*.

How do Decisions Emerge across Layers in Neural Models? Interpretation with Differentiable Masking Nicola De Cao, Michael Sejr Schlichtkrull, Wilker Aziz, and Ivan Titov. 2020. In *EMNLP 2020*.

Evaluating for Diversity in Question Generation over Text Michael Sejr Schlichtkrull, Weiwei Cheng. 2020. Published to *ArXiV*.

Modeling Relational Data with Graph Convolutional Networks Michael Sejr Schlichtkrull*, Thomas N Kipf*, Peter Bloem, Rianne van den Berg, Ivan Titov, and Max Welling. * denotes equal contribution. 2018. In *ESWC 2018*. Won best student research paper award.

Cross-Lingual Dependency Parsing with Late Decoding for Truly Low-Resource Languages Michael Schlichtkrull and Anders Søgaard. 2017. In *EACL 2017*.

Taxonomy Enrichment by Evidence Ranking Michael Schlichtkrull and Hector Martinez Alonso. 2016. In *SemEval 2016*, presented at *NAACL 2016*.

Learning Affective Projections for Emoticons on Twitter Michael Schlichtkrull. 2015. In *CogInfoCom 2015*. Won best paper award.

Workshop Proceedings

Proceedings of the Sixth Fact Extraction and VERification Workshop (FEVER) Mubashara Akhtar, Rami Aly, Christos Christodoulopoulos, Oana Cocarascu, Zhijiang Guo, Arpit Mittal, Michael Schlichtkrull, James Thorne, and Andreas Vlachos. 2023. Colocated with *EACL 2023*.

The Fact Extraction and VERification over Unstructured and Structured Information (FEVEROUS) Shared Task Rami Aly, Zhijiang Guo, Michael Sejr Schlichtkrull, James Thorne, Andreas Vlachos, Christos Christodoulopoulos, Oana Cocarascu, and Arpit Mittal. 2022. In *FEVER 2022*.

Proceedings of the Fifth Fact Extraction and VERification Workshop (FEVER) Rami Aly, Christos Christodoulopoulos, Oana Cocarascu, Zhijiang Guo, Arpit Mittal, Michael Schlichtkrull, James Thorne, and Andreas Vlachos. 2022. Colocated with *ACL 2022*.

Proceedings of the Fourth Workshop on Fact Extraction and VERification (FEVER) Rami Aly, Christos Christodoulopoulos, Oana Cocarascu, Zhijiang Guo, Arpit Mittal, Michael Schlichtkrull, James Thorne, and Andreas Vlachos. 2021. Colocated with *EMNLP 2021*.