# DR EKATERINA (KAT) VYLOMOVA

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## WORK RIGHTS

Australian Citizen (ANZSCO Code: 261313; Occupation: Software Engineer)

## KEY SKILLS

Natural language processing, computational linguistics (morphology), machine learning (incl. deep learning), teaching STEM courses
Main tools & utils: python, R, bash, C++, TeX

## EDUCATION

**The University of Melbourne** *Novermber 2014 – November 2018*
PhD Student in Computer Science, first class honours
Thesis: Compositional Morphology Through Deep Learning (read it here)

**Bauman Moscow State Technical University** *June 2011*
M.Sc. in Computer Science & Engineering
Thesis: Neural Modelling of Mental Lexicon based on the Results of Associative Experiments, Excellent(5)
Overall GPA: 4.9 out of 5

**Moscow Institute of Physics and Technology (State University)** *June 2009*
Additional (M.Sc.) education, Machine Learning & Data Mining
Overall GPA: 5 out of 5

**Bauman Moscow State Technical University** *June 2009*
B.Sc. in Computer Science & Engineering
Thesis: A Recognition System for Semiographic Chants, Excellent(5)
Overall GPA: 3.8 out of 5

## MAJOR SKILLS

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|---|---|
| **Operating Systems** | Ubuntu 8–20, Windows Family |
| **Programming Languages** | Python, R, C#/C++ |
| **Query/Hypertext** | SQL, HTML, XML |
| **Frameworks** | DyNet/Tensorflow, .Net Framework($\leq$ 3.0), Django |
| **DBMS** | PostgreSQL, MySQL |
| **Math & other tools** | R, awk, sed |
| **Spoken languages** | Russian (native), English (fluent), Hebrew, Ukrainian, Bulgarian (basic) |

## LATEST AWARDS & GRANTS

**Defence Science Institute** *2020*
Evaluation of sentiment ambiguity and subjectivity (together with Simon De Deyne)
**Google PhD Fellowship** *2017*
Research support
**The University of Melbourne** *2017*
Travelling Scholarship (for EACL'17)
**The University of Melbourne** *2017*

Excellent in Tutoring Award

**University of Washington** *2015*

Scholarship for participation in Jelinek Summer Workshop on Speech and Language Technology

**The University of Melbourne** *2014*

PhD Program scholarship

**Carnegie Mellon University** *2014*

Scholarship for participation in ACL'14 conference

**The Fulbright Program** *2013*

Visiting Graduate Student

**Russian Foundation for Humanities** *2012*

Grant 12-04-12039B, Information system for cognitive experiments

**ABBYY company** *2012*

Finalist of ABBYY translation cup

**Moscow University of Printing Arts** *2012*

Young Lecturer Award

**Russian Foundation for Humanities** *2012*

Grant 11-04-12025, Automated system for scientific research in the area of computational semiography

**University of Texas, Austin** *2012*

Scholarship for participation & accommodation in NASSLLI-2012

## TEACHING EXPERIENCE

**University of Melbourne, Monash University** Jan, 2021 - Now

*Casual Lecturer* *Melbourne, Australia*

- Co-Lecturing and Coordinating "COMP10001: Foundations of Computing" (Jul – Nov 2022; w/Chris Leckie and Huey Yee Chan; $\sim$ 840 students)
- Co-Lecturing and Coordinating "COMP10001: Foundations of Computing" (Feb – Jun 2022; w/Chris Ewin and Nic Geard; $\sim 1,000$ students)
- Lecturing and Coordinating "COMP10001: Foundations of Computing" (Jan – Feb 2022; Summer Term; $\sim$ 200 students)
- Co-Lecturing and Coordinating "DATA0006: Data Analytics with Python" (Oct – Dec 2021; w/Chris Ewin; $\sim$ 35 students)
- Lecturing and Coordinating "FIT5217: Natural Language Processing" (Mar – Jun 2021; $\sim$ 50 students)
- Lecturing and Coordinating "FIT5217: Natural Language Processing (Suzhou)" (Jun – Aug 2021; $\sim$ 150 students)
- Lecturing and Coordinating "COMP10001: Foundations of Computing" (Jan – Feb 2021; Summer Term; $\sim$ 170 students)

**University of Melbourne** Mar, 2015 - Jun, 2019

*Tutor and Demonstrator* *Melbourne, Australia*

- Running weekly workshops for "Statistical Machine Learning" course (2018): advanced machine learning (PGMs, Bayesian inference, SVMs). Implementing models using Jupyter notebooks
- Running weekly workshops for "Web Search and Text Analysis" course (2018, 2019): advanced machine learning and NLP approaches (LDA, HMMs, Neural MT). Implementing models using Jupyter notebooks
- Running weekly workshops for "Knowledge Technologies" course (2016-2019): basics of information retrieval and machine learning
- Running weekly labs and workshops for "Database Systems and Information Modelling" (2015-2019): ER-modelling and SQL

**Moscow State University of Printing Arts** Sept, 2011 - Jun, 2012
*Lecturer* *Moscow, Russia*

- Running lectures and practical workshops for "Information systems design and operation", "Relational algebra"
- Tools: Django, Python, SQL

## RESEARCH EXPERIENCE

**University of Melbourne** Mar, 2019 - Now
*Postdoctoral Fellow* *Melbourne, Australia*

- Quantitative analysis of a corpus of psychology journals 1930–2017: quantitative analysis of topics being discussed at each time period
- Development of models of diachronic concept change (computational models to evaluate semantic changes in the concepts such as "trauma", "addiction", "harm" )
- Development of methods to measure semantic breadth of concepts
- Investigating how neuroscience influenced certain fields of psychology
- Improvement of existing diachronic models

**The UniMorph Project (`https://unimorph.github.io/`)** Mar, 2017 - Now
*Co-Leading* *AoE*

- Development of a universal morphosyntatic annotation schema
- Enriching the database with new languages
- Co-leading a shared task on morphological re-inflection, during which the new linguistic data is being evaluated and added to the database

**Montclair State University** Jan, 2014 - Oct, 2014
*Visiting Researcher* *Montclair, USA*

- Research in figurative language and automatic detection of non-compositionality in texts (idioms and metaphors)
- Several tutorials on natural language processing and Russian language

## EXPERIENCE IN INDUSTRY

**Kaspersky Labs** Oct, 2016 - Sept, 2017
*Researcher* *Moscow, Russia, remote*

- Organization description: Information security
- Kids protection project. Developing algorithms for adult content identification
- Tools: regular expressions, sed, awk, grep, corpus analysis, python

**Kaspersky Labs** Jun, 2013 - Oct, 2016
*Spam analyst* *Moscow, Russia, remote*

- Organization description: Information security
- E-mail spam filtering and its automation using machine learning techniques
- Tools: regular expressions, sed, awk, grep, corpus analysis, python

**Yandex Corp.** Sept, 2009 - May, 2011
*Web Spam Analyst* *Moscow, Russia*

- Organization description: Web search
- Detection of different types of web-spam: doorways, link spam, content spam.

- Analysis of possible features for automated systems of spam detection (using ML). Developed a methodology to identify synonymized texts and measure texts similarity.
- Tools: Python, awk, sed, grep, R

**Parallels, Inc.** Oct, 2006 - Apr, 2008
*Software Developer* *Moscow, Russia*

- Organization description: Software virtualization, hosting and cloud service provider
- Development of automated testing system for Virtuozzo project (Virtual containers)·
- Tools: C#, NHibernate, PostgreSQL, ASP.Net

**Diasoft, Jsc.** Aug, 2005 - Jun, 2006
*Software Developer* *Moscow, Russia*

- Organization description: Banking systems
- Development of automated testing system for Diasoft 5NT banking system
- Tools: VB .Net, C#

**Parascript, LLC.** Aug, 2003 - May, 2004
*QA* *Moscow, Russia*

- Organization description: UPS automatic sorting system
- Evaluation of handwritten automatic text recognition (OCR system for postal services)

## INVITED TALKS

**Cardamom Series** Jan, 2022
*Documenting and modeling inflectional paradigms in under-resourced languages* *Online*

- Presentation slides
- The talk recording

**Keynote at SIGMORPHON 2021** Aug, 2021
*The Secret Life of Words: Exploring Regularity and Systematicity. Episode II* *Online*

- The event page
- Presentation slides

**SIGTYP Lecture Series** Aug, 2021
*UniMorph and Morphological Inflection Task: Past, Present, and Future* *Online*

- The event page
- Presentation slides
- The talk recording

**Moscow State University** Nov, 2020
*The Secret Life of Words: Exploring Regularity and Systematicity (w/Ryan Cotterell)* *Online*

- The event page
- Presentation slides
- The talk recording

**CHDH Seminar Series** Apr, 2020
*What Do Neural Models "Know" About Natural Language?* *Online*

- The event page
- Presentation slides

## SERVICE

### CONFERENCE REVIEWING: PC

ACL (2016–), EACL (2017–), LREC(2018–), CoNLL (2016–), COLING (2016–), AIST (2015–), WMT (2018–), NAACL (2018–), EMNLP(2016–2018), SCLeM (2017), SIGTYP (2019–), *SEM (2019), LChange (2019–), SIGMORPHON (2019–)

### CONFERENCE REVIEWING: AREA CHAIR

EMNLP(2020), EACL (2021), NAACL (2021), EMNLP (2022)

### WORKSHOPS, SIGS

SIGTYP (`https://sigtyp.github.io/`): co-founder of SIGTYP and the leading organizer of SIGTYP 2019–2022; Co-running FieldMatters (2022), LoResMT (2022)

### SHARED TASKS

SIGTYP 2020–2022, SIGMORPHON Shared Tasks on Morphological Reinflection 2017–2022 (one of the leading organizers in 2020–2022)

## PUBLICATIONS

Google scholar profile: `https://scholar.google.com.au/citations?user=JlVHhVUAAAAJ&hl=en`

(forthcoming) Wheeler M., **Vylomova E.**, McGrath M., Haslam N. 2021. *More confident, less formal: stylistic changes in academic psychology writing from 1970 to 2016.* Scientometrics

**Vylomova E.**, Haslam N. 2021. *Semantic Changes in Harm-related Concepts in English.* Computational approaches to semantic change, 6, 93.

Haslam N., **Vylomova E.**, Murphy S.C., Wilson S. 2021. *The Neuroscientification of Psychology: The Rising Prevalence of Neuroscientific Concepts in Psychology From 1965 to 2016.* Perspectives on Psychological Science. 2021 Jul.

Pimentel T., Ryskina M., Mielke S., Wu S., Chodroff E., Leonard B., Nicolai G., Ate Y., Khalifa S., Habash N., El-Khaissi C. et al. 2021. *SIGMORPHON 2021 Shared Task on Morphological Reinflection: Generalization Across Languages.* In Proceedings of the 18th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, pp. 229-259.

Salesky E., Abdullah B., Mielke S., Klyachko E., Serikov O., Ponti E.M., Kumar R., Cotterell R., **Vylomova E.** 2021. *SIGTYP 2021 shared task: Robust Spoken Language Identification.* In Proceedings of the Third Workshop on Computational Typology and Multilingual NLP, pp. 122-129.

**Vylomova E.**, Salesky E., Mielke S., Lapesa G., Kumar R., Hammarström H., Vulić I., Korhonen A., Reichart R., Ponti E. M., Cotterell R. 2021. *Proceedings of the Third Workshop on Computational Typology and Multilingual NLP*

Scherbakov A., Whittle L., Kumar R., Singh S., Coleman M., **Vylomova E.** 2021. *Anlirika: an LSTM–CNN Flow Twister for Spoken Language Identification.* In Proceedings of the Third Workshop on Computational Typology and Multilingual NLP, pp. 145–148.

Muradoglu S., Evans N., **Vylomova E.** 2020. *Modelling Verbal Morphology in Nen.* In Proceedings of the The 18th Annual Workshop of the Australasian Language Technology Association, pp. 43-53.

Shcherbakov A., Muradoglu S., **Vylomova E.** 2020. *Exploring Looping Effects in RNN-based Architectures.* In Proceedings of the The 18th Annual Workshop of the Australasian Language Technology Association, pp. 115-120.

**Vylomova E**, Ponti E.M., Grossman E., McCarthy A.D., Berzak Y., Dubossarsky H., Vulić I., Reichart R., Korhonen A., Cotterell R. 2020. *Proceedings of the Second Workshop on Computational Research in Linguistic Typology.*

Bjerva J., Salesky E., Mielke S.J., Chaudhary A., Giuseppe C., Ponti E.M., **Vylomova E.**, Cotterell R., Augenstein I. 2020. *SIGTYP 2020 Shared Task: Prediction of Typological Features.* In Proceedings of the Second Workshop on Computational Research in Linguistic Typology, pp. 1-11.

**Vylomova E.**, White J., Salesky E., Mielke S.J., Wu S., Ponti E.M., Maudslay R.H., Zmigrod R., Valvoda J., Toldova S., Tyers F. et al. 2020. *SIGMORPHON 2020 Shared Task 0: Typologically Diverse Morphological Inflection.* In Proceedings of the 17th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology, pp. 1-39.

McCarthy A. D., Kirov C., Grella M., Nidhi A., Xia P., Gorman K.,**Vylomova E.** et al. 2020. *UniMorph 3.0: Universal Morphology.* In Proceedings of The 12th Language Resources and Evaluation Conference, pp. 3922-3931.

Haslam N., Dakin B. C., Fabiano F., McGrath M. J., Rhee J., **Vylomova E.**, Weaving, M. Wheeler, M. A. 2020. *Harm inflation: Making sense of concept creep.* European Review of Social Psychology, 31(1), 254-286.

Di Q., **Vylomova E.**, Baldwin T. 2019. *Modelling Tibetan Verbal Morphology.* In Proceedings of the The 17th Annual Workshop of the Australasian Language Technology Association (ALTA) (pp.35-40). Sydney, Australia

Shcherbakov A., **Vylomova E.** 2019. *A string-to-graph constructive alignment algorithm for discrete and probabilistic language modeling.* In Proceedings of the The 17th Annual Workshop of the Australasian Language Technology Association (ALTA) (pp. 186-191). Sydney, Australia

Gorman K., McCarthy A., Cotterell R., **Vylomova E.**, Silfverberg M., Markowska M. 2019. *Weird inflects but OK: Making sense of morphological generation errors.* In Proceedings of the 23rd Conference on Computational Natural Language Learning (CoNLL) (pp. 140-151). Hong Cong

McCarthy A., **Vylomova E.**, Wu S., Malaviya C., Wolf-Sonkin L., Nicolai G., Kirov C., Silfverberg M., Mielke S., Heinz J., Cotterell R., Hulden M. 2019. *The SIGMORPHON 2019 Shared Task: Morphological Analysis in Context and Cross-Lingual Transfer for Inflection.* In Proceedings of the 16th Workshop on Computational Research in Phonetics, Phonology, and Morphology, ACL, Florence, Italy

**Vylomova E.**, Murphy S., Haslam N. *Evaluation of Semantic Change of Harm-Related Concepts in Psychology.* 2019. In Proceedings of the 1st International Workshop on Computational Approaches to Historical Language Change, ACL, Florence, Italy

Dubossarsky H., McCarthy A., Ponti E., Vulić I., **Vylomova E.**, Berzak Y., Cotterell R., Faruqui M., Korhonen A., Reichart R. 2019. *Proceedings of TyP-NLP: The First Workshop on Typology for Polyglot NLP.*, ACL, Florence, Italy

**Vylomova E.**, Cotterell R., Baldwin T., Cohn T., Eisner J. 2019. *Contextualization of Morphological Inflection.* In Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers), Minnesota, USA

Cotterell R., Kirov C., Sylak-Glassman J., Walther G., **Vylomova E.**, McCarthy A., Kann K., Mielke S., Nicolai G., Silfverberg M., Yarowsky D., Eisner J., Hulden M. 2018. *The CoNLL–SIGMORPHON 2018 Shared Task: Universal Morphological Reinflection.*, Brussels, Belgium

Kirov C., Cotterell R., Sylak-Glassman J., Walther G., **Vylomova E.**, Xia P., Faruqui M., Mielke S., McCarthy A., Kbler S., Yarowsky D., Eisner J., Hulden M. 2018. *UniMorph 2.0: Universal Morphology.* In Proceedings of Language Resources and Evaluation (LREC), Miyazaki, Japan

Cotterell R., Khayrallah H., **Vylomova E.**, Kirov C., Yarowsky D. 2017. *Paradigm Completion for Derivational Morphology.* In Proceedings of Empirical Methods of Natural Language Processing (EMNLP), Copenhagen, Denmark

**Vylomova E.**, Shcherbakov A., Philippovich Yu., Cherkasova G. 2017. *Men Are from Mars, Women Are from Venus: Evaluation and Modelling of Verbal Associations.* Analysis of Images, Social Networks and Texts - Sixth International Conference (AIST), Moscow, Russia

Cotterell R., Kirov C., Sylak-Glassman J., Walther G., **Vylomova E.**, Xia P., Faruqui M., Kubler S., Yarowsky D., Eisner J., Hulden M. 2017. *CoNLL-SIGMORPHON 2017 Shared Task: Universal Morphological Reinflection in 52 Languages.* In Proceedings of the CoNLL SIGMORPHON 2017 Shared Task: Universal Morphological Reinflection, CoNLL, Vancouver, Canada

**Vylomova E.**, Cotterell R., Baldwin T., Cohn T. 2017. *Context-Aware Prediction of Derivational Word-forms.* In Proceedings of European Chapter of the ACL (EACL), Valencia, Spain

Shcherbakov A., **Vylomova E.**, Thieberger N. 2016. *Phonotactic Modeling of Extremely Low Resource Languages.* In Proceedings of Australasian Language Technology Association Workshop (ALTA), Melbourne, Australia

**Vylomova E.**, Rimell L., Cohn T., Baldwin T. 2016. *Take and Took, Gaggle and Goose, Book and Read: Evaluating the Utility of Vector Differences for Lexical Relation Learning.* In Proceedings of ACL-2016, Berlin, Germany

Scherbakov A., **Vylomova E.**, Liu F., Baldwin T. 2016. *SemEval 2016, Task 10: From Incremental Meaning to Semantic Unit (phrase by phrase).* NAACL-16, San Diego, USA

Cohn T., Hoang C.V.,**Vylomova E.**, Yao K., Dyer C., Haffari G. 2016. *Incorporating Structural Alignment Biases into an Attentional Neural Translation Model.* In Proceedings of NAACL-16, 2016. San Diego, USA

Yao K., Cohn T., **Vylomova E.**, Duh K., Dyer C. 2015. *Depth-Gated LSTM.* Jelinek Summer Workshop on Speech and Language Technology, July - August 2015, Seattle, WA, USA

Peng J., Feldman A., **Vylomova E.** 2014. *Classifying Idiomatic and Literal Expressions Using Topic Models and Intensity of Emotions.* In Proceedings of the 2014 Conference on Empirical Methods in Natural Language Processing, EMNLP 2014, October 25-29, 2014, Doha, Qatar

**Vylomova E.**, Philippovich A., Danshina M., Golubeva I., Philippovich Yu. 2014. *Neural Models for Recognition of Basic Units of Semiographic Chants.* Analysis of Images, Social Networks and Texts - Third International Conference, AIST 2014, Yekaterinburg, Russia, April 10-12, 2014, Revised Selected Papers, 249-254

**Vylomova E.** 2013. *Structural characteristics of Russian associative network.* Proceedings of 10th International Congress of the International Society of Applied Psycholinguistics, June 26-29 2013

**Vylomova E.** 2012. *Usage of associative thesauri for solving tasks related to the tip of the tongue phenomenon.* Poster paper, 6th Russian Summer School on Information Retrieval, Yaroslavl, August 6-10 2012

**Vylomova E.**, Philippovich Yu., 2012. *Neural network model of verbal associative network.* Conference Language in culture and society, Peoples Friendship University of Russia, Moscow (in Russian)

**Vylomova E.** 2012. *Analysis of associative thesauri and their application in problems of machine translation.* Conference AIST - Analyses of images, networks and texts, Ekaterinburg, March 16-18 (in Russian)

## REFERENCES

Feel free to request a reference from my PhD supervisors from The University of Melbourne: Tim Baldwin (tb@ldwin.net), Trevor Cohn (tcohn@unimelb.edu.au) and my colleague Ryan Cotterell from ETH Zürich (Assistant Professor; ryan.cotterell@gmail.com).

## CERTIFICATIONS

**Stanford online courses (http://ai-class.org)**
Introduction to Artificial Intelligence

**Brainbench (http://brainbench.com)**
C#

**NeuroProject (http://neuroproject.ru)**
Neural Networks and Genetic Algorithms

**Parascript, LLC**
Pattern recognition and machine learning

**Internet University (http://intuit.ru)**
Object Oriented Programming

**Internet University (http://intuit.ru)**
Neural Networks

## MISC.

Co-managing SIGTYP (Special Interest Group on Computatiional Approaches to Linguistic Typology)
Volunteer editor at "Serious Science", the project explaining scientific research and how it's done. Please see the following examples on Australian languages `http://serious-science.org/australian-languages-7356`, Hebrew `http://serious-science.org/hebrew-8705`, or the Kuiper Belt `http://serious-science.org/kuiper-belt-6274`
Playing Russian intellectual games "What? Where? When?'. I created an English one here, have a try!
Organizer of maths games for 5-9 year-old kids in Melbourne, preparing them for AMC (at no cost)