

# Curriculum Vitae

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## Personal Information

Name: Iuliia Thorbecke (Nigmatulina)  
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## Education

- 2021–present **PhD candidate in Speech Technologies.** *Thesis: "Bridging ASR and NLU".* University of Zürich, Zürich; Idiap Research Institute, Martigny, Switzerland
- o FST;
  - o ASR decoding; Language modelling for ASR;
  - o Contextualisation and personalisation of ASR;
  - o Streaming ASR.
- 2016–2020 **Master's studies in Computational Linguistics and Speech Technologies.** *Thesis: "Acoustic modelling for Swiss German ASR".* University of Zürich, Zürich, Switzerland
- o Deep Learning;
  - o Machine Translation (SMT; NMT);
  - o Programmiertechniken in Computerlinguistik (Python; JavaScript; 3 semesters)
  - o Quantitative Methode.
- 2013–2016 **Postgraduate studies in Phonetics.** *Thesis: "Patterns of Phonetic Modifications in Different Types of Russian Speech".* St. Petersburg State University, St. Petersburg, Russia
- 2007–2013 **Master's degree in Psycholinguistics and General Linguistics (cum laude).** *Thesis: "Sound Contractions in Russian Spontaneous and Prepared Speech" (focus on speech perception algorithms).* St. Petersburg State University, St. Petersburg, Russia

## Experience

- 2020–present **Research Assistant (full-time).** Idiap Research Institute, Martigny, Switzerland
- o Speech recognition for air traffic communication (in collaboration with The German Aerospace Center (DLR)).
  - o ASR pipeline for streaming decoding.
  - o Speech recognition for call centers (in collaboration with the Uniphore company).
  - o Improving rare/special words recognition and integrating OOV words without system retraining.
- 2018–2020 **Tutor (Institute of Computational Linguistics).** University of Zürich, Zürich, Switzerland
- o Language Technology and Web Applications (HS18);
  - o Speech Science and Speech Signal Processing (FS19);
  - o Machine Learning in Computational Linguistics (HS19);
  - o Text Analytics in the Digital Humanities (FS20).

- 2018–2018 **Intern.** SpinningBytes AG (<http://www.spinningbytes.com/>). Computer Software, Winterthur, Switzerland.
- o Natural Language Processing;
  - o Machine Learning;
  - o Sentiment Analysis (working with twitter data);
  - o Elasticsearch.
- 2017–2020 **Student Assistant (Institute of Computational Linguistics).** University of Zürich, Zürich, Switzerland
- o stance detection project;
  - o speech segmentation; phonetic transcription; speech experiments;
  - o training ASR systems; iVector extraction.
- 2011–2016 **Engineer.** Speech Modeling Laboratory (<http://narusco.ru/>). St. Petersburg State University, St. Petersburg, Russia.
- o creation of a spontaneous speech corpus;
  - o phonetic transcription and speech experiments;
  - o studying of intonation contour of spontaneous speech.
- 2014–2016 **Lecturer** (*lectures with presentations; made tasks for student home practice; prepared tests; administered examinations*). St. Petersburg State University of Aerospace Instrumentation (the Faculty of Art), St. Petersburg, Russia
- o Introduction in general Phonetics.
  - o Methods of speech analysis.

## Technical skills

Python (NLTK, sklearn, gensim, spacy etc.); bash scripting  
 Deep Learning experience: PyTorch, TensorFlow, DyNet  
 Speech Recognition (Kaldi, K2/Icefall/Lhotse); Speech processing (PRAAT, Audacity)  
 LLM (SLAM-LLM)  
 SQL and relational DBMS, and basic NoSQL knowledge (ElasticSearch)  
 Basic web development (HTML, CSS, Javascript)  
 Basic statistic analysis in R

## Achievements

- 2012 **Scholarship** for "Excellent Students of St. Petersburg State University"
- 2013 **Diploma and Second Place Award** for "*Best Student Researcher in Phonetics, Speech, Speech & Language Technologies*". (Speech & Multimodal Interfaces Laboratory, St. Petersburg Institute for Informatics and Automation of Russian Academia of Science)

## Research projects

*Recognition of ambiguous fragments of speech signal (evidence from spontaneous Russian).*  
 St. Petersburg State University, Russia.

*Role of pitch in the preservation of unity of "broken" discourse units in spontaneous speech.*  
 St. Petersburg State University, Russia.

*Second language perceptual experience and first language sound identification.* Purdue University, Purdue, USA.

## Languages

Russian - Mother tongue

English - full proficiency

German - fluent

French - fluent

## Interests

- **Drama** (former member of a student theatre company)
- **Art, Drawing, Painting** (Painting course at SPb State Museum of Modern Art)
- **Volunteer** (Sustainability Week, Zürich 2020)
- **French Right and Sociology (in French)**. (Collège Universitaire Français de Saint-Petersbourg, St. Petersburg, Russia; 2011–2012)

## Selected presentations and publications

**Nigmatulina, I.**, Madikeri S., Villatoro-Tello E., Motlicek P., Zuluaga-Gomez J., Pandia K., Ganapathiraju A. Implementing contextual biasing in GPU decoder for online ASR. Proc. Interspeech 2023.

**Nigmatulina, I.**, Zuluaga-Gomez, J., Prasad, A., Sarfjoo, S. S., & Motlicek, P. A two-step approach to leverage contextual data: speech recognition in air-traffic communications. In ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 6282-6286). IEEE.

Zuluaga-Gomez, J., **Nigmatulina, I.**, Prasad, A., Motlicek, P., Veselý, K., Kocour, M., & Szöke, I. (2021). Contextual semi-supervised learning: An approach to leverage air-surveillance and untranscribed ATC data in ASR systems. Proc. Interspeech 2021.

**Nigmatulina, I.**, Braun, R., Zuluaga-Gomez, J., & Motlicek, P. (2021). Improving call-sign recognition with air-surveillance data in air-traffic communication. arXiv preprint arXiv:2108.12156.

Kocour, M., Veselý, K., Szöke, I., Kesiraju, S., Zuluaga-Gomez, J., Blatt, A., Prasad, A., **Nigmatulina, I.**, Motlíček, P., Klakow, D. and Tart, A., 2021. Automatic processing pipeline for collecting and annotating air-traffic voice communication data. Engineering Proceedings, 13(1), p.8.

**Nigmatulina, I.**, Kew, T., and Samardžić, T. ASR for Non-standardised Languages with Dialectal Variation: the case of Swiss German. Accepted for presentation and publication in VarDial workshop, Dec. 2020.

**Nigmatulina, I.**, Kew, T., and Samardžić, T. Swiss German speech-to-text with Kaldi. SwissText, 2020 (presentation).

Kew, T., **Nigmatulina, I.**, Nagele, L., and Samardžić, T. UZH TILT: A Kaldi recipe for Swiss German Speech to Standard German Text. SwissText conference, 2020.

Dmitrieva, O., Conklin, J., **Nigmatulina, Y.** Transferring cue-weighting from second language into first language: Group trends and individual differences. The Journal of Acoustical Society of America, 140(4), 2016. Pp. 3333-3334.

**Nigmatulina, I.**, Riechakajnen, E. Pauses and pitch contours in spontaneous speech processing: Evidence from Russian. Presented at the "Tone and Intonation in Europe" (TIE 2016). University of Kent, Canterbury, the UK 2016 (presentation).

**Nigmatulina Y.**, Rajeva O., Riechakajnen E., Slepokurova N., Vencov A. How to study spoken word recognition: evidence from Russian // *Slavic Languages in the Black Box*. Tuebinger Beitrage zur Linguistik. Tuebingen: narr-Verlag, 2016. Pp. 175-190.

**Nigmatulina Y.** Word-External Reduction in Spontaneous Russian // *Speech and Computer*. Volume 9319 of the series Lecture Notes in Computer Science. Athens 2015. Pp. 495-503.

**Nigmatulina, I.** Phonetic information relevant for spoken word recognition // International conference 'Phonetics and phonology in Europe' (PaPE 2015). University of Cambridge, Cambridge, the UK. 2015 (presentation).

**Nigmatulina Y.** Sound contraction in Russian spontaneous speech and its implications for spoken word recognition // *New Perspectives on Speech in Action*. Proceedings of the 2nd SJUSK Conference on Contemporary Speech Habits. Copenhagen 2013. Pp. 127-140.

**Nigmatulina Y.** Fading of word boundaries in spontaneous and read-aloud speech: evidence from Russian. *St.Petersburg State University Journal*, St.Petersburg, 2017. Pp. 76-88.