

# Marco Cognition

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📄 [mcognition.github.io](https://mcognition.github.io)

Research interests include Automata and Formal Language Theory, String Algorithms, Scientific Computing, and Mathematical Software.

## Education

- 2016-2018 **MS Computer Science**, *Yonsei University*, Seoul, South Korea.  
- Advisor: Dr. Yo-Sub Han  
- Thesis: *Efficient Algorithms for Two Parsing Problems on Probabilistic Finite Automata*
- Spring 2016 **Non-Degree Seeking Graduate Student**, *Florida State University*, Tallahassee, Florida.
- 2011-2015 **BS Discrete Mathematics**, *Georgia Institute of Technology*, Atlanta, GA.  
- Minor in Korean  
- Advisor: Dr. Anton Leykin  
- Thesis: *Straight Line Programs and Automatic Differentiation in Python*

## Work Experience

- 08/19-Present **Software Engineer**, *Google*, Mountain View, CA.  
- Software engineer on the Google Keyboard (Gboard) team.
- 02/19-05/19 **Software Engineering Intern**, *Google*, New York City, NY.  
- Software engineering intern on the OpenFST team within the Speech and Language Algorithms research group.  
- Developed a compression scheme for finite-state transducers used in keyboard language models which led to a first-author publication.
- 09/16-12/18 **Graduate Teaching Assistant**, *Yonsei University*, Seoul, South Korea.  
- TA for CSI2103 Data Structures, CSI 3108 Algorithm Analysis, CSI3109 Automata and Formal Languages, and CSI6512 Graduate Analysis of Algorithms.
- 01/16-05/16 **Upper School Computer Science Teacher**, *Maclay School*, Tallahassee, FL.  
- Taught Computer Programming I, an introductory Python course.  
- Faculty sponsor of the Computer Science Club. Club members learned to make games with Python, built an ALU, and participated in the Florida State University ACM programming competition.
- 05/15-08/15 **Data Science Intern**, *AirSage Inc.*, Atlanta, GA.  
- Used Python and QGIS to track and display population movement patterns.  
- Used Bash and Condor to optimize and automate large data analysis jobs.
- 05/12-08/12 **Software Development Intern**, *AirSage Inc.*, Atlanta, GA.  
- Used Python and Bash to analyze cell phone tower location logs.  
- Used Python and psycopg2 to construct and store geometric representations of cell towers' effective areas in a spatial database.

## Publications

- Jun-U Park, Sang-Ki Ko, **Marco Cognition**, Yo-Sub Han. *SoftRegex: Generating Regex from Natural Language Description using Softened Regex Equivalence*. Empirical Methods in Natural Language Processing (EMNLP) 2019 (to appear).
- Marco Cognition\***, Cyril Allauzen, Michael Riley. *On the Compression of Lexicon Transducers*. Finite-State Methods and Natural Language Processing (FSMNLP) 2019 (to appear).
- Marco Cognition\***, Yo-Sub Han, Soon Chan Kwon. *Online Infix Probability Computation for Probabilistic Finite Automata*. Association for Computational Linguistics (ACL) 2019.
- Marco Cognition\***, Yo-Sub Han, Soon Chan Kwon. *Incremental Computation of Infix Probabilities for Probabilistic Finite Automata*. Empirical Methods in Natural Language Processing (EMNLP) 2018.
- Marco Cognition\***, Yo-Sub Han. *Online Stochastic Pattern Matching*. International Conference on Implementation and Application of Automata (CIAA) 2018.

## Skills

**Programming Languages:** Python/Cython, Julia, Java, C, C++  
**Human Languages:** English, Korean

## Awards/Service

**Association for Computational Linguistics** - Student Volunteer (2019)  
**Yonsei University** - Outstanding International Student Scholarship  
**ACM International Collegiate Programming Contest** - Question Writer (Korea Regional - 2017, 2018)