

# Marco Cagnetta

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Graduate student in Computer Science in the Theory of Computation Lab at Yonsei University under Dr. Yo-Sub Han. Research interests include Automata and Formal Language Theory, String Algorithms, Scientific Computing, and Complexity Theory. Citizen of the United States of America.

## Education

- 2016-Present **MS Computer Science (Expected: Fall 2018)**, *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.  
Advisor Dr. Anton Leykin  
Thesis *Straight Line Programs and Automatic Differentiation in Python*

## Work Experience

- Fall 2016 - **Graduate Teaching Assistant**, *Yonsei University*, Seoul, South Korea.  
Present - TA for CSI2103 - Data Structures - Fall 2016, Fall 2017  
- TA for CSI3108 - Algorithm Analysis - Fall 2016  
- TA for CSI3109 - Automata and Formal Languages - Spring 2017, Spring 2018
- January-May 2016 **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.
- May-August 2015 **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.
- May-August 2012 **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

- **Marco Cagnetta**, Soon Chan Kwon, Yo-Sub Han. *Incremental Computation of Infix Probabilities for Probabilistic Finite Automata*. (To Appear) Empirical Methods in Natural Language Processing (EMNLP) 2018.
- **Marco Cagnetta**, Yo-Sub Han. *Online Stochastic Pattern Matching*. International Conference on Implementation and Application of Automata (CIAA) 2018.
- Hwee Kim, **Marco Cagnetta**, Gyeonggeun Kim, Daniel Průša, Yo-Sub Han. *MaxLoP: Maximum Balanced Local Pseudoknot*. Under Review.

## Research Experience

- Dr. Yo-Sub Han**, Department of Computer Science, Yonsei University.  
- Research revolves around the implementation and application of finite automata and related machines.  
- Currently studying algorithms related to parsing with probabilistic finite automata.
- Dr. Michael Mascagni**, Department of Computer Science, Florida State University.  
- Designed a method to speed up Monte Carlo algorithms for PDE boundary value problems.  
- Implemented a new method for sampling random surface points on geometric primitives.
- Dr. Anton Leykin**, School of Mathematics, Georgia Institute of Technology.  
- Designed and analyzed algorithms for automatic differentiation using straight line programs.  
- Implemented algorithms to reduce the size of straight line programs to increase efficiency.  
- Developed a Python library to fully support the creation, manipulation, evaluation, and automatic differentiation of straight line programs.

## Skills

**Programming Languages (descending order of experience):** Python/Cython, Julia, Java, C, C++  
**Tools:** Linux, SciPy/NumPy, QGIS

## Open Source Contributions

SageMath, NetworkX, JuliaLang

## Awards/Service

- Yonsei University** - Outstanding International Student Scholarship  
**Yonsei University** - Competitive Programming Team Coach  
**ACM International Collegiate Programming Contest** - Question Writer (Korea Regional)