

Marianne Rakic

Curriculum Vitae

PhD Student at CSAIL and EWSC Fellow,
Massachusetts Institute of Technology and Broad Institute

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Education

- PhD Candidate, Massachusetts Institute of Technology** Cambridge MA, 2020-Present
Electrical Engineering and Computer Science (EECS). Current GPA: 5.0/5.0
Advisors: Prof. John V. Guttag and Prof. Adrian V. Dalca.
Research: Machine Learning for Medical Image Analysis.
- M.Sc., Massachusetts Institute of Technology** Cambridge MA, 2020-2022
Electrical Engineering and Computer Science (EECS). GPA: 5.0/5.0
Advisors: Prof. John V. Guttag and Prof. Adrian V. Dalca.
Thesis: Learning Deformable Templates for Brain MRI.
- M.Sc., Swiss Federal Institute of Technology in Zurich** Zurich, Switzerland, 2017-2020
Electrical Engineering and Information Technology. GPA: 5.76/6
Master thesis as visiting student at CAML Group, CSAIL, MIT.
- B.Sc., University of Liege**, Summa cum laude, Liege, Belgium, 2014-2017
Bachelor in Engineering (major: Electrical engineering). GPA: 18.57/20

Work Experience

- Applied Scientist Intern at Amazon.com Services, Inc.** Seattle WA, Summer 2022
Worked on conditioning diffusion networks for complex scenes.

Publications

- Marianne Rakic**, Jose Javier Gonzalez Ortiz, Hallee Wong, John Guttag, and Adrian V Dalca
“Tyche: Stochastic In-Context Learning Model for Medical Image Segmentation”
Extended abstract at Workshop on Uncertainty Quantification for Computer Vision, ICCV: International Conference on Computer Vision. (2023).
- Marianne Rakic**, John Guttag, and Adrian V Dalca
“Anatomical Predictions using Subject-Specific Medical Data”
MIDL: Medical Imaging with Deep Learning. Short Paper. (2020).
- Adrian V Dalca, **Marianne Rakic**, John Guttag, and Mert R Sabuncu
“Learning Conditional Deformable Templates with Convolutional Networks”
NeurIPS: Neural Information Processing Systems (2019), [Acc. rate: 21%].

Selected Research

- Researcher at Clinical and Applied Machine Learning Group, Cambridge MA, 2019-Present
Computer Science and Artificial Intelligence Lab, MIT.

Tyche: Stochastic In-Context Learning Model for Medical Image Segmentation

Developed a learning-based algorithm to capture uncertainty and provide multiple plausible segmentations for in-context learning.

Learning Conditional Deformable Templates with Convolutional Networks

Design a learning-based algorithm to build (potentially conditional) medical imaging templates and rapidly register images to the template.

Deformation Fields to regularize Convolutional Networks

Lead and collaborated with 2 PhD students to explore novel regularization strategy for medical image analysis. We applied random deformation fields at every network feature for every training iteration.

Analyzed the impact on multiple simulated image datasets and on medical images. Compared to well-known regularization baselines including dropout and Gaussian noise.

Anatomical Predictions using Subject-Specific Medical Data (ETH Master Thesis)

Lead project to design a learning-based method to predict the brain anatomical changes. Used deformation fields to leverage an existing MRI brain scan of the subject and supplementary external data to make an accurate prediction.

Scholarships

Eric and Wendy Schmidt Center (EWSC) PhD Fellowship	09.2022-06.2024
Nathaniel Durlach Graduate Fellowship	09.2020-06.2021
Entrance Scholarship Fernand PISART	05.2014

Service

Reviewer at Women in Computer Vision Workshop, ICCV	2023
Reviewer at Uncertainty Quantification for Computer Vision Workshop, ICCV	2023

Teaching and Leadership

EECS Graduate Application Assistance Program Mentor , MIT, Cambridge. MIT, Cambridge.	09.2021-12.2021
TA: Algebra, Mathematical Analysis I and Mathematical Analysis II Prof. Éric JM Delhez, University of Liege, Belgium.	09.2016-05.2017
TA: Elements of Probability Prof. Louis Wehenkel, University of Liege, Belgium.	02.2017-05.2017
European Career Fair Treasurer at European Club , MIT	01.2021-12.2021
President at Graduate Women in Course 6 , MIT	01.2021-12.2021
President at Visiting Student Association Board , MIT	05.2019-11.2019
Organizing committee at FAIL! Inspiring Resilience at MIT ,	07.2019-10.2019

Computer Skills

Coding: PyTorch, TensorFlow, Keras, Python, MATLAB, C, L^AT_EX and Microsoft Office.

Most Relevant Courses: Advanced Machine Learning, Advances in Computer Vision, Probabilistic Artificial Intelligence, Introduction to Mathematical Optimization.

Languages

French (Native), **English** (fluent), **Spanish** (Intermediate), **German** (advanced beginner).

Other Research Experience

Semester Project II, Computer Vision Lab, ITET, ETH Zurich , Switzerland Advisors: Prof. Ender Konukoglu, Dr. Christian Baumgartner and Anna Volokitin, In collaboration with the company Ava AG. Analyzed machine learning methods including Gaussian Processes, neural networks and Deep Gaussian Processes to classify noisy sparse multi-dimensional medical time series provided by Ava AG.	10.2018 – 01.2019
Semester Project I, Automatic Control Lab, ITET, ETH Zurich , Switzerland Advisors: Prof. Maryam Kamgarpour and Dr. David Adjashvili Built efficient strategies for firefighting in urban environment leveraging mixed-integer programming and dynamic programming.	03.2018 – 07.2018