

# Đorđe Miladinović

## Curriculum Vitæ

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🌐 [djordjemila](https://github.com/djordjemila)



Software Engineer | Machine Learning Researcher | PhD in Computer Science

## Summary

I am a computer scientist with a machine learning-focused PhD. I have expertise in taking projects from concept to working system.

## Skills & Highlights

Mainly coding in Python • PyTorch • Tensorflow • C/C++ • Java • Matlab • Bash • SQL •  $\LaTeX$   
Experienced in Torch • HTML • CSS • Jekyll • Javascript • NodeJS • MongoDB • PostgreSQL • Blender • C# • VHDL  
Frameworks used Unix • Git • SVN • PyTorch-Lightning • Fairseq • NLTK • OpenCV • Pandas • Scikit-learn • SciPy • NumPy • Scrapy • Django • ROS • UML • Amazon AWS • Hadoop MapReduce • MS Office • Excel  
Background in Software Design • Algorithms & Data Structures • Operating Systems • Microprocessors & Embedded Systems  
Research areas Deep Learning • Generative Modeling • Computer Vision • Natural Language Processing • Applied ML  
Worked with Prof. Joachim Buhmann • Prof. Jürgen Schmidhuber • Prof. Bernhard Schölkopf • Prof. Otmar Hilliges

## Education

- Sep'17-Jun'21 **ETH Zürich – PhD in Computer Science – Machine Learning.**  
• Thesis: "On Training Deep Generative Models with Latent Variables" with Prof. Joachim Buhmann.  
• Focus: Generative image and text modeling | variational autoencoders | representation learning | deep learning for biology.
- Sep'13-Jun'16 **ETH Zürich – MS in Computer Science.**  
• Thesis: "Perceptual Analysis Framework for Discovering Anomalies in Humanoid Arm Motions" with Prof. Otmar Hilliges.  
• Focus: Software engineering | distributed computing | machine learning.
- Sep'09-Sep'13 **University of Belgrade, ETF – BS in Electrical Engineering & Computer Science.**  
• Focus: Software/hardware engineering and design.

## Work Experience

- Feb'17-Present **ETH Zürich, Institute for Machine Learning – Research Scientist.**  
• [Python/PyTorch] I led a team of researchers to develop a web platform that uses convolutional neural networks to recognize sleep patterns from brain signals (<https://sleeplearning.ethz.ch>) – over 10'000 submissions worldwide.  
• [Python/PyTorch] I co-invented a new type of neural network for realistic image synthesis. I used it *develop a state-of-the-art variational autoencoder* for image modeling ([github.com/djordjemila/sdn](https://github.com/djordjemila/sdn)).  
Research, development and *project management* in interdisciplinary collaborations:  
• *Zurich Exhalomics* (<https://hochschulmedizin.uzh.ch/zurich-exhalomics>) – I led a team of students to develop a tool that automatically calibrates the mass spectrum of human breath, and also a machine-learning algorithm to detect causal relations between metabolites in the human body and sleep stages (relating metabolism to sleep).  
• *Sleep Loop* ([sleeploop.ch](https://sleeploop.ch)) – I co-developed an algorithm to recognize sleep stages from wireless device recordings.  
• *VirtaMed collaboration* (<https://www.virtamed.com>) – I developed a machine-learning algorithm with UI to evaluate the performance of trainee surgeons on a virtual surgery simulator (see the demo at <https://bit.ly/2PJqY2J>).
- Sep'18-Dec'18 **Max Planck Institute for Intelligent Systems – Research Scientist.**  
• [Python/PyTorch] I applied principles of causal reasoning to (i) develop a neural network architecture that improves unsupervised learning of dynamical systems across environments; (ii) validate representations of deep generative models.
- Sep'16-Feb'17 **Logitech Europe S.A. Data Science & Advanced Analytics – Software Engineer | ML Engineer.**  
• [Python/SQL] I developed a machine-learning algorithm that (i) collects and processes user activity logs for a Logitech product from the database; (ii) uses processed data to identify user cohorts and perform targeted advertising.  
• [Java/Scrapy] I implemented a natural language processing algorithm that (i) scrapes opinions from Amazon reviews on different Logitech products; (ii) automatically analyzes the sentiments from those reviews for different product aspects.
- Jan'16-Sep'16 **Disney Research Zürich, Vision and Sensing Research Group – Research Scientist | ML Engineer.**  
• [Python/C++/Matlab/Blender/HTML/CSS] I designed a framework for detecting mechanical failures in Disney's humanoid robots based on IMU sensor readings. It utilizes a machine-learning algorithm that provides the human-like judgment on robot degradation. To provide training data for the algorithm, I also designed a web survey in which the participants compared graphical renderings of proper and degraded human motions.

## Languages

Serbian (Native), English (Fluent), German (B1), Spanish (Beginner)

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## Academic Activities

- Dec'19 I co-organized the "Disentanglement Challenge" at NeurIPS 2019 ([bit.ly/36bTD4W](https://bit.ly/36bTD4W)).
- 2017-2021 Reviewer at NeurIPS, ICML and ICLR.
- 2017-2020 Taught "Advanced Machine Learning" and "Statistical Learning Theory" at ETH Zürich.
- 2017-2020 Supervised more than 10 MS students (<https://djordjemila.github.io/#teaching-mentoring>).

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## Selected Publications

- [1] **Đorđe Miladinović**, Aleksandar Stanić, Stefan Bauer, Jürgen Schmidhuber & Joachim M. Buhmann  
*Spatial Dependency Networks: Neural Layers for Improved Generative Image Modeling*  
International Conference on Learning Representations, **ICLR 2021**
  - [2] Raphael Suter, **Đorđe Miladinović**, Stefan Bauer & Bernhard Schölkopf  
*Robustly Disentangled Causal Mechanisms: Validating Deep Representations for Interventional Robustness*  
International Conference on Machine Learning, **ICML 2019**
  - [2] **Đorđe Miladinović**, Muhammad Waleed Gondal, Bernhard Schölkopf, Joachim M. Buhmann & Stefan Bauer  
*Disentangled state space representations*  
DeepGen workshop, International Conference on Representation Learning, **ICLR 2019**
  - [3] **Đorđe Miladinović** et al.  
*SPINDLE: End-to-end Learning from EEG/EMG to Extrapolate Animal Sleep Scoring Across Experimental Settings, Labs and Species*, **PloS Computational Biology 2019**
- See the complete list at <https://djordjemila.github.io/#publications>

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## Hobbies

Waterpolo • Swimming • Skiing and snowboarding • Tennis • Cinematography • Reading