



**UNIVERSITÉ
DE GENÈVE**

Phd Position Opening in Machine Learning and Digital Phenotyping of Autism

Position in a nutshell: Use machine learning techniques to predict altered social interactions associated with autism, with large scale clinical and natural experiment data (e.g., video, sound, kinect, lidar, IoT). The scientific objective is to contribute to breakthrough results in digital phenotyping of autism. The clinical objective is to deliver technologies to scale up the screening and evaluation of autism disorder spectrum. This position is open as part of a Swiss National Science Foundation (SNSF) [Sinergia research project](#) running until 2025 in collaboration with [IDIAP Research Institute](#) and [University of Applied Sciences and Arts of Southern Switzerland](#).

Motivation: Nowadays, 1 in 44 children is diagnosed with autism spectrum disorders (ASD), which makes this condition one of the most prevalent neurodevelopmental disorders. Early diagnosis at scale of autism in young children requires the development of tools for digital phenotyping and automated screening, through computer vision. Meanwhile, current gold-standard approaches in autism are not intended to provide a precise quantitative estimate of ASD symptoms in children. We therefore aim to examine the potential of digital sensing to provide automated measures of the extended autism phenotype, for the purpose of stratifying autism subtypes in ways that would allow for precision medicine.

Background: Recent developments in digital sensing, big data and machine-learning have offered unforeseen opportunities for seamless sensing of body movement, social scene capture, and measure of object manipulation. See [1] for background and latest research by the research team on Digital Phenotyping of Autism at the University of Geneva.

Context: This doctoral project position is offered as part of a Swiss National Science Foundation (SNSF) Sinergia grant entitled [Digital Phenotyping of Autism Spectrum Disorders in Children](#) (2021-2025).

¹ Kojovic, N., Natraj, S., Mohanty, S.P. *et al.* Using 2D video-based pose estimation for automated prediction of autism spectrum disorders in young children. *Sci Rep* **11**, 15069 (2021). <https://doi.org/10.1038/s41598-021-94378-z>

Expertise of the candidate: Strong skills in computer vision and annotation (including via crowdsourcing), geometric modeling of 3D scenes featuring human bodies and objects (static or in motion), applied machine learning, as well as interests in advanced machine learning, such as generative adversarial networks.

Goals of the PhD thesis: using large amounts of video and annotated data, model and predict the determinants of social interaction impairments, which correspond to digital phenotyping of autism.

About the recruitment :

a. Important dates:

- Posted on : **Thursday, February, 24th 2022**
- Application deadline : **Review of applications starts on March 14th, 2022** and will continue until the position is filled
- Expected start of the PhD : **May 2022**
- Expected end of the PhD : **Sept. 2025**

b. Prepare the following documents :

- How your expertise makes you a unique candidate for this position (max. 1'500 characters)
- List 5 most relevant publications / technical reports
- Curriculum vitae
- Upload a motivation video (max. 45'')

c. For submission, please fill the following form :

<https://forms.gle/3oe3SRpQNmy5Au4p9>

d. Next steps, if you are short-listed :

- You will be invited to give a seminar presenting your machine learning research and it can best contribute the above stated scientific and clinical goals of the digital phenotyping of autism (25 minutes presentation + 35 Q&A)

e. University of Geneva is an equal opportunity employer.

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