# NEMANJA RAKIĆEVIĆ

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## Research interests

Representation learning, Deep reinforcement learning, Neuroevolution, Quality-Diversity, Robotics

## Education

**2016 – 2021** **PhD researcher** (**Thesis submitted**)
Robot Intelligence Lab, Imperial College London
Thesis title: Parameter Space Abstractions for diversity-based Policy Search
Researched approaches for efficient diversity-based policy search, in the context of movement control policies for continuous robot control. Developed methods based on active learning, gaussian processes, generative models and evolutionary algorithms.

**2011 – 2013** **MSc European Master On Advanced Robotics** (**EMARO**), **double degree**
Thesis development: Keio University, Japan
2nd year: Ecole Centrale de Nantes, grade average A
1st year: University of Genova, grade average A

**2007 – 2011** **BSc Mechatronics, Robotics and Automatization.**
Faculty of Technical Sciences, University of Novi Sad.
240 ECTS, grade average 10 [100/100]

## Employment and academic activities

**09/2018 – 01/2019** **Research Intern: DeepMind,** London, UK
Researching methods for state-space exploration for efficient Sim2Real transfer, in the context of reinforcement learning for continuous robot control.
[Host: Francesco Nori]

**(06 – 08)/2017** **Data Scientist: WeAreHuman.io** (**previously CitySail**), London, UK
Developing and implementing models for real-time human personality estimation.

**01/2015 – 05/2016** **Research Assistant: iBug group, Imperial College London,** UK
Researching non-linear sequential probabilistic models for emotion intensity recognition, based on facial expressions and audio data. Developed multimodal neural conditional random fields for behaviour analysis, specifically interpersonal agreement.

**2015 – now** **Graduate Teaching Assistant: Imperial College London,** UK
Machine Learning (prof Maja Pantic),
Computing II, Robotics (Dr Petar Kormushev)
Data Structures and Algorithms (Dr Heikki Peura)

**12/2013 – 07/2014** **Research Engineer: RIS group, LAAS-CNRS,** Toulouse, France
Researching methods for rover locomotion diagnostics using proprioceptive sensor signals obtained in field experiments. Focusing on sequential machine learning methods for modelling temporal dynamics of rover locomotion.

**07/2013** MSc thesis testing sessions: Japanese Aerospace Exploration Agency's (JAXA) Institute of Space and Astronautical Science on the "Cuatro" rover test bed

**2011** Team leader: National robotics competition (EUROBOT)

**(09 – 10)/2010** **Intern: Mihajlo Pupin Institute,** Belgrade, Serbia
Developing movement controller code for a 5 DOF robotic arm and a small rover.
[Host: Professor Aleksandar Rodić]

## Publications

**N Rakicevic**, A Cully, P Kormushev. *"Exploring the Manifold Hypothesis in the Context of Neural Network Parameters"*, [in preparation], 2021

**N Rakicevic**, A Cully, P Kormushev. *"Policy Manifold Search: Exploring the Manifold Hypothesis for Diversity-based Neuroevolution"*, GECCO, 2021

RP Saputra, **N Rakicevic**, I Kuder, J Bilsdorfer, A Gough, A Dakin, E de Cocker, S Rock, R Harpin, P Kormushev. *"ResQbot 2.0: An Improved Design of a Mobile Rescue Robot with an Inflatable Neck Securing Device for Safe Casualty Extraction"*, MDPI Applied Sciences, 2021

RP Saputra, **N Rakicevic**, D Chappell, K Wang, P Kormushev. *"Hierarchical Decomposed-Objective Model Predictive Control for Autonomous Casualty Extraction"*, IEEE Access, 2021

**N Rakicevic**, A Cully, P Kormushev. *"Policy Manifold Search for Improving Diversity-based Neuroevolution"*, Beyond Backpropagation Workshop (NeurIPS), 2020 [**oral 8% acceptance rate**]

RP Saputra, **N Rakicevic**, P Kormushev. *"Sim-to-Real Learning for Casualty Detection from Ground Projected Point Cloud Data"*, IROS, 2019

**N Rakicevic**, P Kormushev. *"Active Learning via Informed Search in Movement Parameter Space for Efficient Robot Task Learning and Transfer"*, AURO, 2019

**N Rakicevic**, P Kormushev. "*Efficient Robot Task Learning and Transfer via Informed Search in Movement Parameter Space*", AIRW (NIPS), 2017

**N Rakicevic**, O Rudovic, S Petridis, M Pantic. "*Multi-Modal Neural Conditional Ordinal Random Fields for Dynamic Agreement Level Classification*", ICPR, 2016

**N Rakicevic**, O Rudovic, S Petridis, M Pantic. "*Neural Conditional Ordinal Random Fields for Agreement Level Estimation*", WASA, 2015.

## Services

Reviewer **International Conference Learning Representations; 2021**
Reviewer **Journal of Intelligent & Robotic Systems; 2020**
Reviewer **International Conference Machine Learning; 2020** (**top reviewer**)
Reviewer **NeurIPS 2019 Workshop on Robot Learning**; **2019, 2020**
Reviewer **IEEE International Conference on Humanoid Robots; 2019**
Reviewer **IEEE International Conference on Robotics and Automation; 2018, 2020**

## Skills

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| Computer skills | [active] Python, Tensorflow, MuJoCo, Box2D, PyBullet, LaTeX, Git<br>[passive] PyTorch, MATLAB, C/C++, Solid Edge, Pro/ENGINEER |
| Languages | Serbian, English, Italian, Spanish, French |
| Hobbies | Capoeira Club "Capoeira Associação Sérvia" (since 2005), Surfing, Drawing |

## Seminars

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| **2020** | DAAD Postdoc-Net-AI Fellow |
| **2019** | Machine Learning Summer School, London, UK |
| **2017** | Deep Reinforcement Learning Bootcamp, Berkeley, CA |

## Awards and recognitions

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| **2016 – 2020** | Imperial College London President's PhD Scholarship |
| **2011 – 2013** | Erasmus Mundus scholarship laureate for the EMARO MSc programme |
| **2010/2011** | Declared best student in generation 2010/11, University of Novi Sad |
| **2010 – 2013** | "Dositeja" scholarship laureate, Ministry of Youth and Sport, Republic of Serbia |
| **2009/2010** | University of Novi Sad scholarship laureate |
| **2008 – 2012** | Annual award to exceptional students, Ministry of Education, Republic of Serbia |