

# Nick Ioannidis

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## Education

Sep. 2023 - Present  
Vancouver, Canada

### University of British Columbia

*Master of Science, Computer Science*

Supervisor: Professor Michiel van de Panne

Thesis Topic: Environment Aware Planning using Diffusion Models for Humanoid Characters

Sep. 2017 - Apr. 2023  
Vancouver, Canada

### University of British Columbia

*Bachelor of Applied Science, Engineering Physics (with distinction)*

## Research Experience

May 2024 - Present

### Planning and Control for Humanoid Characters

*UBC · Motion Control and Character Animation Group (MOCCA)*

Supervised by Professor Michiel van de Panne

- Actively researching on how to leverage diffusion models conditioned on the environment for footstep planning of physics-based characters
- Actively researching on how to learn walking controllers using reinforcement learning in imitation-free settings

May 2022 - Aug. 2022

### Exploring New Sampling Methods for Off-Policy RL

*UBC · Department of Computer Science*

Supervised by Professor Mark Schmidt

- Developed new non-uniform sampling methods for off-policy reinforcement learning in continuous control environments
- Implemented newly proposed sampling algorithms in PyTorch, designed and developed visualizations for experimental setup

Sep. 2021 - Apr. 2022

### Alzheimer's Disease Classification with Transformer-Based Methods

*UBC · Canary Cognition Research Group*

Supervised by Professor Hyeju Jang

- Explored transfer-learning methods for Language Models in small target dataset settings
- Implemented fine-tuning techniques for Language Models and improved baseline performance on AD classification

May 2021 - Aug. 2021

### Non-Uniform Sampling in Off-Policy RL

*UBC · Department of Computer Science*

Supervised by Professor Mark Schmidt

- Explored different sampling methods for off-policy reinforcement learning in continuous control
- Trained multiple agents on Mujoco benchmarks using DeepMind Control Suite on high performance computing
- Co-wrote paper published in NeurIPS 2021 Deep RL Workshop

## Publications

1. Nicholas Ioannidis, Jonathan Wilder Lavington, and Mark Schmidt. An empirical study of non-uniform sampling in off-policy reinforcement learning for continuous control. In *Deep RL Workshop NeurIPS 2021*, 2021

## Other Work Experience

- |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jun. 2020 - Apr. 2021 | <b>Machine Learning Engineer</b><br><i>UBC-MRI Research Centre</i> <ul style="list-style-type: none"><li>• Implemented and trained on different architectures for volumetric segmentation such as 3D U-nets and V-nets in PyTorch</li><li>• Studied physical properties of microstructures in order to generate synthetic ones</li><li>• Augmented sparse dataset by populating scans with synthetic microstructures using Matlab and Julia</li></ul>                                                    |
| Jan. 2019 - Apr. 2019 | <b>Software Engineer</b><br><i>Craft Metrics</i> <ul style="list-style-type: none"><li>• Implemented backend system for customer provisioning using Go</li><li>• Further developed and integrated data pre-processing system from real-time data with main pipeline in Python</li></ul>                                                                                                                                                                                                                  |
| Jun. 2018 - Sep. 2018 | <b>R&amp;D Electrical Engineer</b><br><i>Recycling Alternative</i> <ul style="list-style-type: none"><li>• Reconfigured a series of compost reactors and designed a data collection system in Python</li><li>• Established a Master-Slave communication between a main Raspberry Pi and various Arduino's</li><li>• Designed and implemented a control loop for each reactor to measure temperature, humidity levels, carbon dioxide, and ammonia concentrations in various initial conditions</li></ul> |

## Projects

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|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jan. 2024 - May 2024  | <b>Grounding LLM Plans via Simulation Context</b><br><i>UBC · CPSC 532V: Commonsense Reasoning in Natural Language Processing</i> <ul style="list-style-type: none"><li>• Investigated a potential solution on improving the planning capabilities of LLMs by providing feedback to generated plans through environment interaction</li></ul>                                                                                                                                                                 |
| Sep. 2023 - Dec. 2023 | <b>Robot-to-Robot Transfer for Quadruped Locomotion</b><br><i>UBC · CPSC 554X: Machine Learning and Signals</i> <ul style="list-style-type: none"><li>• Used motion-imitation objectives with RL on reference motions from the Open-X Embodiment dataset to learn a policy for quadruped robots with different morphologies</li></ul>                                                                                                                                                                         |
| Sep. 2022 - May 2023  | <b>State Estimation and Quadruped Locomotion</b><br><i>UBC · CPSC 448A: Directed Studies supervised by Professor Michiel van de Panne</i> <ul style="list-style-type: none"><li>• Implemented state estimator for the Solo8 quadruped robot, following the work of MIT's Biomimetic Robotics Lab</li><li>• Designed URDF model of the Stella quadruped robot for RaiSim physics engine</li><li>• Built RL environment using the gym framework for the Stella quadruped robot to train on simulation</li></ul> |

Sep. 2022 - Dec. 2022	<b>Automatic Curriculum Generation for Hard Exploration Tasks in Minecraft</b> <i>UBC · CPSC 532S: Multimodal Learning with Vision, Language and Sound</i> <ul style="list-style-type: none"> <li>• Generated task traversal curriculum for Minecraft agent using GPT-3</li> <li>• Implemented PPO with Self-Imitation Learning and integrated it with Minecraft gym environment</li> </ul>
Sep. 2022 - Dec. 2022	<b>Survey on Domain Adaptation for Sim-to-Real Transfer in Robotics</b> <i>UBC · CPSC 532M: Machine Learning and Data Mining</i> <ul style="list-style-type: none"> <li>• Conducted literature review on methods for Domain Adaptation in vision control robotics for Sim-to-Real transfer</li> </ul>
Sept. 2021 - Apr. 2022	<b>Open Sim2Real: a cost-effective robotic platform for RL research</b> <i>UBC · ENPH 479: Engineering Capstone II</i> <ul style="list-style-type: none"> <li>• Built a monopod robot inspired by the design from the Open Dynamic Robot Initiative</li> <li>• Implemented a simulated model and designed a training environment using the gym framework</li> <li>• Trained on popular reinforcement learning algorithms (PPO, SAC) and successfully performed standing and balancing tasks in both simulation and the physical robot</li> </ul>
Sep. 2019 - May 2021	<b>Open Robotics Software Lead</b> <i>UBC Engineering Design Team</i> <ul style="list-style-type: none"> <li>• Implemented control algorithms for the Turtlebot robot to perform household tasks using ROS and Python</li> <li>• Utilized multimodal inputs (audio and video) for navigation tasks</li> <li>• Ranked second place and won the people's choice award in Robocup@Home International Challenge</li> </ul>
Jan. 2020 - Apr. 2020	<b>Artifact Removal and Biomarker Segmentation</b> <i>UBC · EECE 571T: Advanced Machine Learning</i> <ul style="list-style-type: none"> <li>• Performed artifact removal and biomarker segmentation for follicular lymphoma TMA cores using UNets</li> </ul>
Sept. 2019 - Dec. 2019	<b>Automated License Plate Detection Vehicle</b> <i>UBC · ENPH 353: Engineering Physics Project I</i> <ul style="list-style-type: none"> <li>• Designed simulated robot in Gazebo integrated with ROS</li> <li>• Performed automated vision-controlled navigation</li> <li>• Trained neural network model for license plate detection</li> </ul>

## Teaching

Sep. 2024 - Dec. 2024	<b>Graduate Teaching Assistant</b> <i>UBC · CPSC 533V: Learning to Move</i>
Jan. 2024 - Apr. 2024	<b>Graduate Teaching Assistant</b> <i>UBC · CPSC 340: Machine Learning and Data Mining</i>

Sep. 2023 - Dec. 2023	<b>Graduate Teaching Assistant</b> <i>UBC · CPSC 314: Computer Graphics</i>
Sep. 2022 - Apr. 2023	<b>Undergraduate Teaching Assistant</b> <i>UBC · ENPH 353: Engineering Physics Project I</i>

## Scholarships and Awards

2022	<b>NSERC Undergraduate Student Research Award, \$6000</b> <ul style="list-style-type: none"> <li>• Awarded to students demonstrating exemplary qualities for research in natural sciences</li> </ul>
2019	<b>UBC BASc Dean's Honour List Designation</b> <ul style="list-style-type: none"> <li>• Awarded to students in the Bachelor of Applied Science Program at UBC in any Winter Session with a sessional average of at least 80% while taking 30 or more credits.</li> </ul>
2019	<b>NSERC Experience Award, \$4500</b> <ul style="list-style-type: none"> <li>• Awarded to companies for access to talented natural sciences and engineering undergraduate students for a work term.</li> </ul>

## Skills

<b>Programming Languages</b>	Python, C++, MATLAB, Julia, Go
<b>Machine Learning Libraries</b>	PyTorch, Tensorflow
<b>Robotics Software</b>	ROS package management (Colcon, CMake), Git, Ubuntu Linux
<b>Embedded Systems</b>	NVIDIA Jetson, Raspberry Pi, Arduino, STM32
<b>Mechatronics</b>	Machine shop, Electrical prototyping, CAD (Onshape, Solidworks)
<b>Spoken Languages</b>	English, Greek