

# Nick Ioannidis

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## Education

Sep. 2023 - Present

**University of British Columbia**

*M.Sc. Masters of Computer Science*

*Research Supervisor: Michiel van de Panne*

Sep. 2017 - Apr. 2023

**University of British Columbia**

*B.A.Sc. Bachelor of Applied Science in Engineering Physics*

## Research Interests

Planning & Control for Physics-Based Characters and Embodied AI

## Ongoing Research Projects

**Planning with Diffusion Models for Physics Based Characters**

*UBC · Department of Computer Science*

Supervised by Dr. Michiel van de Panne

## Previous Research Experience

May 2022 - Aug. 2022

**Non-Uniform Sampling in RL - Research Assistant**

*UBC · Department of Computer Science*

Supervised by Dr. Mark Schmidt

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

Sep. 2021 - Apr. 2022

**Alzheimer's Disease Classification using NLP - Research Assistant**

*UBC · Canary Cognition Research Group*

Supervised by Dr. Hyeju Jang (IUPUI)

- 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 RL - Research Assistant**

*UBC · Department of Computer Science*

Supervised by Dr. 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
- Cowrote paper and got published in NeurIPS 2021 Deep RL Workshop

## Other Work Experience

Jun. 2020 - Apr. 2021	<b>Machine Learning Engineer</b> <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> <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> <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>

## Teaching

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>

## Competitions

Jun. 2020	<b>Robocup@Home Education Challenge</b> Ranked second place and won the people's choice award
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## Presentations

Jul. 2022	<b>Deep Learning with Importance Sampling</b> <i>UBC · Machine Learning Reading Group</i>
Jul. 2021	<b>Basics of Geometric Deep Learning</b> <i>UBC · Machine Learning Reading Group</i>

## Course Projects

Jan. 2024 - May 2024	<b>Grounding LLM Plans via Simulation Context</b> <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> <i>UBC · CPSC 554X: Machine Learning and Signals</i> <ul style="list-style-type: none"><li>- Use 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> <i>UBC · CPSC 448A: Directed Studies supervised by Dr. 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 - April. 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>
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>

## 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