

Victor Butoi

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RESEARCH INTERESTS Machine Learning, Medical Imaging, Domain Adaptation, Computer Vision, Generative Modeling, and Uncertainty Quantification.

ACADEMIC BACKGROUND **Massachusetts Institute of Technology** August 2022 - May 2027
Ph.D. Computer Science Cambridge, Massachusetts

Cornell University Sep 2018 - May 2022
B.Sc. Computer Science Ithaca, New York
► GPA: 3.96/4.3

PUBLICATIONS

1. UniverSeg: Universal Medical Image Segmentation
(In Submission), *MedNeurIPS* (2022)
Victor Butoi*, Jose Javier* Gonzalez Ortiz, Tianyu Ma John Guttag, Mert Sabuncu, Adrian Dalca
2. DEUP: Direct Epistemic Uncertainty Prediction
TLMR (2023)
Moksh Jain*, Salem Lahlo*, Hadi Nekoei, **Victor Butoi**, Paul Bertin, Jarrid Rector-Brooks, Maksym Korablyov, Yoshua Bengio

EMPLOYMENT HISTORY **IBM** June 2023 - Present
Research Intern Cambridge, MA
► Coming soon!

ASAPP May 2022 - Sep 2022
Research Intern New York, NY
Advised by Dr. Felix Wu & Prof. Kilian Weinberger
► Implemented state-space (S4) models for long sequence classification tasks.
► Devised alternative architecture that improves SOTA performance on Long Range Arena (LRA) while reducing model complexity.

MIT CSAIL, CAML Group May 2021 - May 2022
Research Intern Cambridge, MA
Advised by Professor John Guttag & Professor Adrian Dalca
► Developed novel domain-adaption segmentation algorithms utilizing hyper-networks.
► Researched several meta-learning and few-shot algorithms for comparison with proposed method.

Mila - Quebec AI Institute, LambdaZero Team May 2020 - Feb 2021
Research Intern Quebec, Canada
Advised by Professor Yoshua Bengio & Professor Pierre-Luc Bacon
► Coded GP regression and MC-Dropout for comparison in uncertainty quantification and data-driven model optimization.

- ▶ Implemented message-passing graph neural networks for prediction of molecule binding energy. Achieved 93% ranking accuracy, and ran statistical analysis to demonstrate performance in molecule space.
- ▶ Constructed novel molecule vocabularies and coded/bench-marked RL algorithms in molecule generation.

Siemens Healthineers

Research Intern

Jun 2019 - Aug 2019

Plainsboro, NJ

Advised by Dr. Florin Ghesu

- ▶ Implemented several machine learning papers in Pytorch, including UNet and Mask-RCNN, for medical segmentation.
- ▶ Achieved state of the art 96.5% accuracy for the targeted anatomy and created a system for production.
- ▶ Attempted Kaggle's pneumothorax segmentation challenge and altered system to score in top 20th percentile.

Cornell Bailey Hortorium

Lab Assistant

Feb 2019 - Mar 2020

Ithaca, NY

Advised by Professor Kevin Nixon

- ▶ Overhauled Cornell's plant specimen file system by constructing a MySQL database and image-processing python scripts.
- ▶ Created and maintained a web-server for hosting a very large data-set of plant specimens using Apache.
- ▶ Utilized open-cv for a custom bar-code detector that with 90 percent accuracy can detect and isolate an image bar-code, and use this to automatically calibrate resolution of an image.

HONORS AND AWARDS

Massachusetts Institute of Technology

NSF Graduate Research Fellow (16% acceptance rate)

Cornell University

Merrill Presidential Scholar (awarded to top 1% of class)

Tau Beta Pi (awarded to top 12.5% of school of engineering)

Outstanding TA Award (awarded to top 10% of TAs)

Wood Excellence Engineering Research Grant

CIS Dream Grant

Tanner Dean Research Grant

Dean's List (all semesters)

Johnson Controls Foundation Scholarship

Tanner Dean Scholar

APPLICABLE SKILLS

Languages: Python, Java, C/C++, OCaml, SQL, JavaScript, React, Bash, MATLAB

Libraries: Pytorch, JAX, Torch Geometric, BoTorch, Keras/Tensorflow, Git, Jupyter, Docker, Weights&Biases

RESEARCH EXPERIENCE

Cornell University

Advised by Professor Adrian Dalca & Professor Mert Sabuncu

Aug 2019 - May 2022

Ithaca, NY

Datasets as Datapoints for Few-Shot Segmentation

- ▶ Proposed learning framework for image segmentation in the setting of few-shot learning that allows for segmentation on unseen targets with limited annotations in one forward pass. Aggregated over 40 clinical segmentation datasets and extensively experimented to demonstrate our effectiveness in limited data regimes.

Binary Stochastic Neural Networks

- ▶ Assisted in creation of neural-network project where the weights are binary-precision and utilize stochastic Gumbel softmax for more robust predictions. Bench-marked robustness performance of VGG and Resnet based architectures on CIFAR10, TinyImageNet, and Corrupted CIFAR10.

Single Layer Networks

- ▶ Created a novel network architecture scheme that utilizes a single set of weights for all layers in a convolutional network. This performs at nearly the same capacity of standard CNNs, as demonstrated on OASIS brain segmentation and registration

TEACHING EXPERIENCE

Advanced Topics in Machine Learning (CS 6784) Dec 2021 - May 2022
Teaching Assistant, Graduate Level

- ▶ Instructor: Professor Kilian Weinberger

Introduction to Machine Learning (CS 4780) Sep 2021 - Dec 2021
Head Teaching Assistant

- ▶ Instructors: Professor Kilian Weinberger, Anil Damle

OO Programming and Data Structures (CS 2110) Jun 2021 - Aug 2021
Teaching Assistant

- ▶ Instructor: Professor Ali Erkan

Introduction to Machine Learning (CS 4780) Jan 2021 - May 2021
Head Teaching Assistant

- ▶ Instructor: Professor Thorsten Joachims

Introduction to Machine Learning (CS 4780) Sep 2020 - Dec 2020
Teaching Assistant

- ▶ Instructor: Professor Thorsten Joachims

Computer System Organization (CS 3410) Jan 2020 - May 2020
Teaching Assistant

- ▶ Instructor: Professor Hakim Weatherspoon

OUTREACH AND LEADERSHIP

GAAP (Graduate Application Assistance Program) Sep 2022 - Present
Mentor
Cambridge, MA

- ▶ Mentor students applying for graduate school from underprivileged backgrounds.

Cornell Data Science May 2021 - May 2022
President
Ithaca, NY

- ▶ Facilitated club operations of 60+ undergraduates pursuing data science projects.

Association for Computer Science Undergraduates Sep 2019 - Sep 2021
Academic Team Chair
Ithaca, NY

- ▶ Twice lead undergraduate research night involving 30+ PhDs and 200+ undergrads.

Inspirit AI

AI Instructor

May 2021 - Aug 2021

Remote

- ▶ Taught AI concepts made curriculum and led 30 high schoolers in AI projects.

LAST UPDATED *March 16th, 2023*