


VIKRAM VOLETI




PhD candidate at Mila; former Research Intern at  Google,  Unity,  Meta ; 4+ years of work experience

 [voletiv.github.io](https://github.com/voletiv)

 vikram.voleti@gmail.com

 [Google Scholar](#)

 [LinkedIn](#)

RESEARCH	Deep learning for image, video, 3D: led multiple projects; experienced in collaborating with international partners in industry and academia; expert at machine learning research and development. Projects: Video prediction using Score-based Diffusion models [1], Neural ODEs [14]; 3D human pose estimation and inverse kinematics [3]; Image generation with Normalizing flows [4], neural radiance fields, GANs [16], etc.	
EDUCATION	 Mila, University of Montreal, Canada PhD in Computer Science — <i>Supervisor:</i> Prof. Christopher Pal	<i>Fall 2018 - present (09/23)</i> (A) 4.0 / 4.3
	 Indian Institute of Technology (IIT), Kharagpur, India Dual Degree (B.Tech. (H) + M.Tech.) in Electrical Engineering with Master's specialization in Instrumentation and Signal Processing	<i>2009 - 2014</i> 8.44 / 10
RESEARCH INTERNSHIPS DURING PHD	 Meta (formerly Facebook), Menlo Park, USA <i>Team:</i> AI for Metaverse (AI4RL); <i>Supervisors:</i> Dr. Yashar Mehdad, Dr. Barlas Oguz <ul style="list-style-type: none">Research on denoising diffusion models for video and 3D object generationLeading project in collaboration with international teams, applying research to virtual reality product	<i>Aug-Dec 2022</i>
	 Unity Technologies, Montreal, Canada (MITACS Research Intern) <i>Team:</i> Deep Pose, Unity Labs; <i>Supervisor:</i> Dr. Boris Oreshkin <ul style="list-style-type: none">3D human pose estimation and inverse kinematics from videos, published at SIGGRAPH Asia [3]Led project on AI-assisted animation workflows, contributed to product pipeline with code, demos	<i>Oct 2021 - Aug 2022</i>
	 Google, Mountain View, USA <i>Team:</i> Google AI Perception; <i>Supervisors:</i> Dr. Bryan Seybold, Dr. Sourish Chaudhuri <ul style="list-style-type: none">Research on multimodal semi-supervised Active Speaker Detection in videos	<i>Sep-Dec 2019</i>
WORK EXPERIENCE	IIIT Hyderabad, India — Research Fellow; <i>Supervisor:</i> Prof. C. V. Jawahar <ul style="list-style-type: none">Synthesized educational videos in regional Indian languages by generating lips from audioDeveloped automated pipeline to create large-scale audio-video datasetFull paper published at ICASSP 2019 [16], short paper published at CVPR 2018 Workshop	<i>May 2017 - Aug 2018</i>
	GreyOrange Robotics, Gurgaon, India — Image Processing Engineer <ul style="list-style-type: none">Developed embedded vision module for video processing in real time for warehouse automationSolely responsible for development and testing of code, video processing module, camera drivers, server	<i>Feb 2016 - May 2017</i>
	Airbus, Bengaluru, India — Associate Engineer <ul style="list-style-type: none">Avionics software development and integration following standard avionics coding guidelines (DO-178B)Simulated signal-level modifications to the Flight Warning Computer, contributed to the full coding V-cycle	<i>Jul 2014 - Feb 2016</i>
OTHER PROFESSIONAL EXPERIENCE	Blue Lion Labs, Canada — AI Advisor <ul style="list-style-type: none">Provide technical guidance and mentorship to startup on the design and development of AI/ML systems	<i>Oct 2020 - present</i>
	NextAI - Toronto, Canada — AI Scientist-in-Residence <ul style="list-style-type: none">Provided scientific and technical support to start-ups selected in yearly co-hort of NextAI accelerator	<i>Mar-Sep 2020</i>
	IVADO/Mila Deep Learning School, Montreal, Canada — Teaching Assistant	<i>Sep 2019</i>
	NextAI - Montreal, Canada — Scientist-in-Residence <ul style="list-style-type: none">Provided scientific and technical support to start-ups selected in yearly co-hort of NextAI accelerator	<i>Apr-Sep 2019</i>
	Playment, Bengaluru, India — Computer Vision Consultant <ul style="list-style-type: none">Provided technical guidance to early-stage startup on semantic segmentation models for autonomous driving	<i>Jan-Jun 2018</i>
	TalentSprint, Hyderabad, India — Mentor, Foundations of AI & ML (inaugural program) <ul style="list-style-type: none">Designed and delivered tutorials on machine learning, and provided mentorship to industry professionals	<i>Jan-May 2018</i>
AWARDS	Outstanding Reviewer at CVPR 2021	<i>May 2021</i>
	Microsoft Diversity Award for Doctoral Research, \$6,000	<i>Dec 2020</i>
	MITACS Accelerate Research Internship, \$30,000	<i>Oct 2020</i>
	University of Montreal entrance scholarship, \$37,000	<i>Sep 2018</i>
	IIIT Hyderabad merit scholarship for summer school, \$1,000	<i>Jul 2017</i>

SERVICE	Organizer — ICCV 2021 - Differentiable 3D Vision and Graphics workshop OWCV 2021 (Canadian Computer Vision workshop), Canada GRAPHQUON 2020 (Canadian Computer Graphics workshop), Canada	<i>Feb-Oct 2021</i> <i>Feb-Apr 2021</i> <i>Oct-Dec 2020</i>
	Reviewer — Journal on Computer Vision and Image Understanding, CVPR 2022, ACML 2021, NeurIPS 2021, ICCV 2021, CVPR 2021 (<i>Outstanding Reviewer</i>), ICLR 2020, NeurIPS 2020, ICML 2020, NeurIPS 2019, CCAI @ ICLR 2020, CCAI @ NeurIPS 2019, LLD @ ICLR 2019	
PAST RESEARCH INTERNSHIPS	KU Leuven , Belgium — <i>Supervisor</i> : Prof. Ingrid Verbauwhede, ESAT • Designed arithmetic operations using Carry-Free Logic, simulated circuits in Xilinx	<i>Summer 2013</i>
	IIT Kharagpur , India — <i>Supervisor</i> : Prof. Aurobinda Routray, Electrical Engineering • Made a gesture recognition program in MATLAB using Hidden Markov Models	<i>Summer 2012</i>
	Imperial College , UK — <i>Supervisor</i> : Prof. Peter Cheung, Electrical & Electronics • Measured the relative power consumption among the LookUp Tables (LUTs) of an FPGA	<i>Summer 2011</i>
RESEARCH PAPERS (SELECT)	<ol style="list-style-type: none"> [1] “MCVD: Masked Conditional Video Diffusion for Prediction, Generation, and Interpolation”, V. Voleti, A. Jolicoeur-Martineau, C. Pal - <i>NeurIPS 2022</i> [arXiv] [2] “Score-based Denoising Diffusion with Non-Isotropic Gaussian Noise Models”, V. Voleti, C. Pal, A. Oberman - <i>NeurIPS 2022 Workshop</i> [arXiv] [3] “SMPL-IK: Learned Morphology-Aware Inverse Kinematics for AI Driven Artistic Workflows”, V. Voleti, B. N. Oreshkin, F. Bocquet, F. G. Harvey, L. Ménard, C. Pal - <i>SIGGRAPH Asia 2022</i> [arXiv] [4] “Multi-Resolution Continuous Normalizing Flows”, V. Voleti, C. Finlay, A. Oberman, C. Pal - <i>Submitted to a journal</i> [arXiv] [5] “FairCal : Fairness Calibration for Face Verification”, T. Salvador, S. Cairns, V. Voleti, N. Marshall, A. Oberman - <i>ICLR 2022</i> [arXiv] [6] “Plankton-FL: Exploration of Federated Learning for Privacy-Preserving Training of Deep Neural Networks for Phytoplankton Classification”, D. Zhang, V. Voleti, A. Wong, J. Deglint - <i>CVIS 2022 (Oral)</i> [7] “Generative Models of Brain Dynamics”, M. Ramezani-Panahi, G. Abrevaya, J.C. Gagnon-Audet, V. Voleti, I. Rish, G. Dumas - <i>Frontiers in Artificial Intelligence (journal)</i> [arXiv] [8] “Towards Generating Large Synthetic Phytoplankton Datasets for Efficient Monitoring of Harmful Algal Blooms”, N. Bamra, V. Voleti, A. Wong, J. Deglint - <i>FSS at AAAI 2022</i> [arXiv] [9] “Improving Continuous Normalizing Flows using a Multi-Resolution Framework”, V. Voleti, C. Finlay, A. Oberman, C. Pal - <i>ICML 2021 Workshop</i> [10] “gradSim: Differentiable simulation for system identification and visuomotor control” , K. M. Jatavallabhula, M. Macklin, F. Golemo, V. Voleti, L. Petrini, M. Weiss, B. Considine, J. Parent-Lévesque, K. Xie, K. Erleben, L. Paull, F. Shkurti, D. Nowrouzezahrai, S. Fidler - <i>ICLR 2021</i> [arXiv] [11] “Accounting for Variance in Machine Learning Benchmarks”, X. Bouthillier, P. Delaunay, M. Bronzi, A. Trofimov, B. Nichyporuk, J. Szeto, N. Sepah, E. Raff, K. Madan, V. Voleti, S. E. Kahou, V. Michalski, D. Serdyuk, T. Arbel, C. Pal, G. Varoquaux, P. Vincent - <i>MLSys 2021</i> [arXiv] [12] “Frustratingly Easy Uncertainty Estimation for Distribution Shift”, T. Salvador, V. Voleti, A. Iannantuono, A. Oberman - <i>Preprint</i> [arXiv] [13] “Learning to Combine Top-Down and Bottom-Up Signals in RNNs with Attention over Modules”, S. Mittal, A. Lamb, A. Goyal, V. Voleti, M. Shanahan, G. Lajoie, M. Mozer, Y. Bengio - <i>ICML 2020</i> [arXiv] [14] “Simple Video Generation using Neural ODEs”, V. Voleti, D. Kanaa, S. E. Kahou, C. Pal - <i>NeurIPS 2019 Workshop</i> [arXiv] [15] “Comparing Normalization in Conditional Computation Tasks”, V. Michalski, V. Voleti, S. E. Kahou, A. Oritz, P. Vincent, C. Pal, D. Precup - <i>ICML 2019 Workshop</i> [arXiv] [16] “Cross-Language Speech Dependent Lip-Synchronization”, V. Voleti, A. Jha, V. P. Namboodiri, C. V. Jawahar - <i>ICASSP 2019</i> [pdf] [17] “Lip-Synchronization for Dubbed Instructional Videos”, V. Voleti, A. Jha, V. P. Namboodiri, C. V. Jawahar - <i>CVPR 2018 Workshop (FIVER)</i> [pdf] [18] “A Multimodal Approach for Image De-fencing and Depth Inpainting”, S. Jonna, V. Voleti, R. R. Sahay, and M. S. Kankanhalli - <i>ICAPR 2015</i> [pdf, IEEE] 	

TALKS	<ul style="list-style-type: none"> • “MVCD: Masked Conditional Video Diffusion” — NeurIPS 2022, New Orleans, USA [slides] <i>Dec 2022</i> • “SMPL-IK: Learned Morphology-Aware Inverse Kinematics for AI Driven Artistic Workflows” — SIGGRAPH Asia, Diagu, South Korea [slides, video] <i>Dec 2022</i> • “Normalizing flows” — Learning Representations (course), University of Montreal, Canada <i>Nov 2022</i> • “Score-based Denoising Diffusion Models - a tutorial” — Mila, Canada [slides, video] <i>Sep 2022</i> • “Solving Video Tasks using Denoising Diffusion Models” — Samsung Toronto, Canada [slides] <i>Aug 2022</i> • “MVCD: Masked Conditional Video Diffusion” — Mila, Canada <i>May 2022</i> • “Denoising Diffusion GANs” — Mila, Canada [slides] <i>Feb 2022</i> • “Training GANs by Solving ODEs” — Mila, Canada [slides] <i>Apr 2021</i> • “Score-based Generative Models with SDEs” — Mila, Canada [slides] <i>Feb 2021</i> • “Continuous Normalizing Flows” — Mila, Canada [slides] <i>Sep 2020</i> • “GANs: the story so far” — Summer Symposium on AI Research, India [slides, video] <i>Jul 2020</i> • “A brief tutorial on Neural ODEs” — Mila, Canada [slides, video] <i>Jul 2020</i> • “Mathematics of Neural ODEs” — University of Guelph, Canada [slides] <i>Apr 2020</i> • “Simple Video Generation using Neural ODEs” — IIIT Hyderabad, India [slides] <i>Jan 2020</i> • Tutorial on “GANs” — AI for Social Good Summer Lab, Montreal <i>May 2019</i> • “BigGAN” — Mila, University of Montreal, Canada [slides] <i>Oct 2018</i> • “Image de-fencing using RGB-D data” — MPI Informatics, Saarbrücken, Germany [slides] <i>Feb 2018</i> • “Intuition behind LSTMs” — IIIT Hyderabad, India [slides] <i>Feb 2018</i> • Tutorial on “Back-propagation” — IIIT-Hyderabad, India [slides] <i>Aug 2017</i> • “Mathematics of back-propagation” — GreyOrange Robotics, India [slides] <i>Feb 2017</i> 	
SKILLS	C/C++, CUDA, HTML/CSS, Javascript, Jax, Keras, \LaTeX , MATLAB, OpenCV, OS X, Python, PyTorch, R, Shell, SLURM, Tensorflow, Ubuntu, Verilog, Windows	
TEACHING EXPERIENCE	University of Montreal , Montreal, Canada — Guest Lecturer <i>Nov 2020</i>	
	<ul style="list-style-type: none"> • Representation Learning (IFT 6135) by Prof. Aishwarya Agrawal 	
	University of Montreal , Montreal, Canada — Teaching Assistant <i>Sep-Dec 2020</i>	
	<ul style="list-style-type: none"> • Fundamentals of Machine Learning (IFT 6390) by Prof. Ioannis Mitliagkas 	
	Summer Symposium on AI Research , India — Guest Speaker <i>Jul 2020</i>	
	University of Montreal , Montreal, Canada — Teaching Assistant <i>Sep 2019</i>	
	<ul style="list-style-type: none"> • Fundamentals of Machine Learning (IFT 6390) by Prof. Ioannis Mitliagkas 	
	IVADO/Mila Deep Learning School , Montreal, Canada — Teaching Assistant <i>Sep 2019</i>	
	AI for Social Good Summer Lab , Montreal, Canada — Lecturer <i>May 2019</i>	
	TalentSprint , Hyderabad, India — Mentor, Foundations of AI & ML (inaugural program) <i>Jan-May 2018</i>	
	<ul style="list-style-type: none"> • Designed and presented tutorials on machine learning, and mentored industry professionals 	
THESIS PROJECTS	<i>Supervisor:</i> Prof. Rajiv Sahay, Electrical Engineering, IIT Kharagpur, India	
	Master’s thesis — “De-fencing of Images using RGB-D Data” <i>2013 - 2014</i>	
	<ul style="list-style-type: none"> • Elimination of fence-like occlusions, and inpainting of images using RGB-D data • Nominated for Best Project Award among three departments, research work published at ICAPR 2015 	
	Bachelor’s thesis — “Identification of Bilabial Lip Closures in Audio and Video” <i>2012 - 2013</i>	
	<ul style="list-style-type: none"> • Measurement of synchronization between audio and video using bilabial cues in both modes 	