

Curriculum Vitae

Siddharth Narayanaswamy

School of Informatics
University of Edinburgh
10 Crichton St, Newington, Edinburgh EH8 9AB

October 26, 2023

www.iffsid.com
siddharth@iffsid.com
n.siddharth@ed.ac.uk
+44 7874 269532

Professional Experience

Reader in Explainable AI, School of Informatics, University of Edinburgh	July 2020 —
Safe & Ethical AI Senior Research Fellow, The Alan Turing Institute	July 2022 —
Safe & Ethical AI Research Fellow, The Alan Turing Institute	Nov 2019 — May 2021
Senior Researcher, Department of Engineering Science, University of Oxford	May 2019 — July 2020
Postdoctoral Research Assistant, Department of Engineering Science, University of Oxford	Jan 2016 — Apr 2019
Postdoctoral Scholar, Department of Psychology, Stanford University	Apr 2014 — Dec 2015
Graduate Research Assistant, School of Electrical & Computer Engineering, Purdue University	Aug 2008 — Mar 2014

Education

Doctor of Philosophy (PhD), School of Electrical & Computer Engineering, Purdue University	Aug 2008 — Mar 2014
Thesis: Compositionality in Vision and Language	
Bachelor of Engineering (BE), Electronics & Communication, Anna University, India	Aug 2004 — Aug 2008

Grants & Fellowships

Turing — Advanced Autonomy through Human-AI collaboration	Co-I	Oct 2021 — Dec 2022
Edinburgh Lab for Integrated AI	PI	Oct 2021 — Apr 2024
Huawei Edinburgh Lab	PI	July 2021 — July 2025
Facebook ParlAI Research Award	Co-Investigator	Oct 2017 — Nov 2018
EPSRC MURI Grant EP/N019474/1 — Commonsense Visual Reasoning	Senior/Key personnel	Jan 2016 — Aug 2020

Peer-Reviewed Journal Articles

- J6 R. de Bem, A. Ghosh, T. Ajanthan, O. Miksik, A. Boukhayma, N. Siddharth*, and P. H. S. Torr*. **DGPose: Deep Generative Models for Human Body Analysis** *International Journal of Computer Vision (IJCV)* 128.5 (2020), pp. 1537–1563.
- J5 A. Muryy, N. Siddharth, N. Nardelli, A. Glennerster, and P. H. S. Torr. **Lessons from Reinforcement Learning for Biological Representations of Space** *Vision Research (VR)* 174 (2020), pp. 79–93.
- J4 D. P. Barrett*, A. Barbu*, N. Siddharth*, and J. M. Siskind. **Saying What You're Looking For: Linguistics Meets Video Search** *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)* 38.10 (2016), pp. 2069–2081.
- J3 H. Yu*, N. Siddharth*, A. Barbu*, and J. M. Siskind. **A Compositional Framework for Grounding Language Inference, Generation, and Acquisition in Video** *Journal of Artificial Intelligence Research (JAIR)* 52 (2015), pp. 601–713.
- J2 A. Barbu*, N. Siddharth*, A. Michaux, and J. M. Siskind. **Simultaneous Object Detection, Tracking, and Event Recognition** *Advances in Cognitive Systems (ACS)* 2 (2012), pp. 203–220.
- J1 N. Siddharth*, A. Barbu*, and J. M. Siskind. **Seeing Unseeability to See the Unseeable** *Advances in Cognitive Systems (ACS)* 2 (2012), pp. 77–94.

Peer-Reviewed Conference Proceedings

- C25 M. Opper, V. Prokhorov, and N. Siddharth. **StrAE: Autoencoding for Pre-Trained Embeddings using Explicit Structure** *In Empirical Methods in Natural Language Processing (EMNLP)*. Dec. 2023.
- C24 Y. Liang, J. Tenenbaum, T.-A. Le, and N. Siddharth. **Drawing out of Distribution with Neuro-Symbolic Generative Models** *In Advances in Neural Information Processing Systems (NeurIPS)*. Dec. 2022.
- C23 Y. Shi, N. Siddharth, P. Torr, and A. R. Kosiorek. **Adversarial Masking for Self-Supervised Learning** *In International Conference on Machine Learning (ICML)*. June 2022.
- C22 T. Joy, Y. Shi, P. H. S. Torr, T. Rainforth, S. M. Schmon, and N. Siddharth. **Learning multimodal VAEs through mutual supervision** *In International Conference on Learning Representations (ICLR)*. May 2022.
- C21 T. A. Le, K. M. Collins, L. Hewitt, K. Ellis, N. Siddharth, S. J. Gershman, and J. B. Tenenbaum. **Hybrid Memoised Wake-Sleep: Approximate Inference at the Discrete-Continuous Interface** *In International Conference on Learning Representations (ICLR)*. May 2022.

- C20 N. Miao, E. Mathieu, N. Siddharth, Y. W. Teh, and T. Rainforth.
On incorporating inductive biases into VAEs
In *International Conference on Learning Representations (ICLR)*. May 2022.
- C19 Y. Shi, J. Seely, P. Torr, N. Siddharth, A. Hannun, N. Usunier, and G. Synnaeve.
Gradient Matching for Domain Generalization
In *International Conference on Learning Representations (ICLR)*. May 2022.
- C18 T. Joy, S. Schmon, P. Torr, N. Siddharth*, and T. Rainforth*.
Capturing Label Characteristics in VAEs
In *International Conference on Learning Representations (ICLR)*. May 2021.
- C17 Y. Shi, B. Paige, P. Torr, and N. Siddharth.
Relating by Contrasting: A Data-efficient Framework for Multimodal Generative Models
In *International Conference on Learning Representations (ICLR)*. May 2021.
- C16 M. Igl, A. Gambardella, N. Nardelli, N. Siddharth, W. Böhmer, and S. Whiteson.
Multitask Soft Option Learning
In *Uncertainty in Artificial Intelligence (UAI)*. Aug. 2020.
- C15 Y. Shi*, N. Siddharth*, B. Paige, and P. H. S. Torr.
Variational Mixture-of-Experts Autoencoders for Multi-Modal Deep Generative Models
In *Advances in Neural Information Processing Systems (NeurIPS)*. Dec. 2019, pp. 15692–15703.
- C14 T. A. Le, A. R. Kosiorek, N. Siddharth, Y. W. Teh, and F. Wood.
Revisiting Reweighted Wake-Sleep for Models with Stochastic Control Flow
In *Uncertainty in Artificial Intelligence (UAI)*. July 2019.
- C13 E. Mathieu*, T. Rainforth*, N. Siddharth*, and Y. W. Teh.
Disentangling Disentanglement in Variational Autoencoders
In *International Conference on Machine Learning (ICML)*. June 2019, pp. 4402–4412.
- C12 B. Esmaeili, H. Wu, S. Jain, A. Bozkurt, N. Siddharth, B. Paige, D. H. Brooks, J. Dy, and J.-W. van de Meent.
Structured Disentangled Representations
In *International Conference on Artificial Intelligence and Statistics (AISTATS)*. Apr. 2019, pp. 2525–2534.
- C11 R. De Bem, A. Ghosh, A. Boukhayma, T. Ajanthan, N. Siddharth*, and P. Torr*.
A conditional deep generative model of people in natural images
In *Winter Conference on Applications of Computer Vision (WACV)*. Jan. 2019, pp. 1449–1458.
- C10 S. Webb, A. Golinski, R. Zinkov, N. Siddharth, T. Rainforth, Y. W. Teh, and F. Wood.
Faithful Inversion of Generative Models for Effective Amortized Inference
In *Advances in Neural Information Processing Systems (NeurIPS)*. Dec. 2018, pp. 3074–3084.
- C9 D. Massiceti, N. Siddharth, P. K. Dokania, and P. H. S. Torr.
FlipDial: A Generative Model for Two-Way Visual Dialogue
In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. June 2018, pp. 6097–6105.
- C8 N. Siddharth, B. Paige, J.-W. van de Meent, A. Desmaison, N. D. Goodman, P. Kohli, F. Wood, and P. H. S. Torr.
Learning Disentangled Representations with Semi-Supervised Deep Generative Models
In *Advances in Neural Information Processing Systems (NeurIPS)*. Dec. 2017, pp. 5927–5937.
- C7 A. Barbu*, D. P. Barrett*, W. Chen, N. Siddharth*, C. Xiong, J. J. Corso, C. D. Fellbaum, S. J. H. Catherine Hanson, S. Helie, E. Malaia, B. A. Pearlmutter, J. M. Siskind, T. M. Talavage, and R. B. Wilbur.
Seeing is Worse than Believing: Reading People's Minds Better than Computer-Vision Methods Recognize Actions
In *Proceedings of the European Conference on Computer Vision (ECCV)*. Sept. 2014, pp. 612–627.
- C6 N. Siddharth*, A. Barbu*, and J. M. Siskind.
Seeing What You're Told: Sentence-Guided Activity Recognition in Video
In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. June 2014, pp. 732–739.
- C5 Y. Cao, D. P. Barrett, A. Barbu, N. Siddharth, H. Yu, A. Michaux, Y. Lin, S. Dickinson, J. M. Siskind, and S. Wang.
Recognizing Human Activities from Partially Observed Videos
In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. June 2013, pp. 2658–2665.
- C4 A. Barbu*, A. Bridge, Z. Burchill, D. Coroian, S. Dickinson, S. Fidler, A. Michaux, S. Mussman, N. Siddharth*, D. Salvi, L. Schmidt, J. Shangguan, J. M. Siskind, J. Waggoner, S. Wang, J. Wei, Y. Yin, and Z. Zhang.
Video In Sentences Out
In *Proceedings of the Twenty-Eighth Conference on Uncertainty in Artificial Intelligence (UAI)*. Aug. 2012, pp. 102–112.
- C3 N. Siddharth*, A. Barbu*, and J. M. Siskind.
A Visual Language Model for Estimating Object Pose and Structure in a Generative Visual Domain
In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. May 2011, pp. 4854–4860.
- C2 A. Barbu*, N. Siddharth*, and J. M. Siskind.
Learning Physically-Instantiated Game Play Through Visual Observation
In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. May 2010, pp. 1879–1886.
- C1 N. Siddharth, M. Manivannan, S. Devasahayam, and G. Mathew.
Design of a Do-It-Yourself VR based Laparoscopic Simulator
In *Medicine Meets Virtual Reality (MMVR)*. 2009.

Technical Reports

- T7 A. B. Palmarini, C. G. Lucas, and N. Siddharth.

DreamDecompiler: Improved Bayesian Program Learning by Decompiling Amortised Knowledge

ArXiv e-prints, arXiv:2306.07856 (June 2023), arXiv:2306.07856. arXiv: [2306.07856](#) [cs.AI].

T6 V. Prokhorov, I. Titov, and N. Siddharth.

Autoencoding Conditional Neural Processes for Representation Learning

ArXiv e-prints, arXiv:2305.18485 (May 2023), arXiv:2305.18485. arXiv: [2305.18485](#) [cs.LG].

T5 D. Massiceti, V. Kulharia, P. K. Dokania, N. Siddharth, and P. H. S. Torr.

A Revised Generative Evaluation of Visual Dialogue

ArXiv e-prints, arXiv:2004.09272 (Apr. 2020), arXiv:2004.09272. arXiv: [2004.09272](#) [cs.CV].

T4 S. Bhatti, A. Desmaison, O. Miksik, N. Nardelli, N. Siddharth*, and P. H. S. Torr*.

Playing Doom with SLAM-Augmented Deep Reinforcement Learning

ArXiv e-prints (Dec. 2016). arXiv: [1612.00380](#) [cs.AI].

T3 A. Stuhlmüller, R. X. D. Hawkins, N. Siddharth, and N. D. Goodman.

Coarse-to-Fine Sequential Monte Carlo for Probabilistic Programs

ArXiv e-prints (Sept. 2015). arXiv: [1509.02962](#) [cs.AI].

T2 A. Barbu*, N. Siddharth*, C. Xiong, J. J. Corso, C. D. Fellbaum, C. Hanson, S. J. Hason, S. Helie, E. Malaia, B. A. Pearlmutter, J. M. Siskind, T. M. Talavage, and R. B. Wilbur.

The Compositional Nature of Verb and Argument Representations in the Human Brain

ArXiv e-prints (June 2013). arXiv: [1306.2293](#) [q-bio.NC].

T1 A. Barbu*, A. Bridge, D. Coroian, S. Dickinson, S. Mussman, N. Siddharth*, D. Salvi, L. Schmidt, J. Shangquan, J. M. Siskind, J. Waggoner, S. Wang, J. Wei, Y. Yin, and Z. Zhang.

Large-Scale Automatic Labeling of Video Events with Verbs Based on Event-Participant Interaction

ArXiv e-prints (Apr. 2012). arXiv: [1204.3616](#) [cs.CV].

Workshop Publications

W11 M. Opper, J. Morrison, and N. Siddharth.

On the Effect of Curriculum Learning with Developmental Data for Grammar Acquisition

In *EMNLP Workshop CoNLL-CMCL Shared Task BabyLM Challenge*. 2023.

W10 M. Opper, V. Prokhorov, and N. Siddharth.

StrAE: Autoencoding for Pre-Trained Embeddings using Explicit Structure

In *EMNLP Workshop on Unimodal & Multimodal Induction of Linguistic Structures*. 2022.

W9 N. Siddharth and B. Paige.

Learning Generative Models from Classifier Uncertainties

In *ICML Workshop on Uncertainty & Robustness in Deep Learning*. 2020.

W8 C. S. de Witt, B. Gram-Hansen, N. Nardelli, A. Gambardella, R. Zinkov, P. Dokania, N. Siddharth, A. B. Espinosa-Gonzalez, A. Darzi, and P. H. S. Torr.

Simulation-Based Inference for Global Health Decisions

In *ICML Workshop on ML for Global Health*. 2020.

W7 R. de Bem, A. Ghosh, T. Ajanthan, O. Miksik, N. Siddharth*, and P. H. S. Torr*.

A Semi-supervised Deep Generative Model for Human Body Analysis

In *ECCV Workshop on Human Behaviour Understanding*. 2018.

W6 M. Igl, W. Boehmer, A. Gambardella, P. H. S. Torr, N. Nardelli, N. Siddharth, and S. Whiteson.

Inference and Distillation for Option Learning

In *NeurIPS Workshop on Infer to Control*. 2018.

W5 D. Massiceti*, P. K. Dokania*, N. Siddharth*, and P. H. S. Torr.

Visual Dialogue without Vision or Dialogue

In *NeurIPS Workshop on Critiquing and Correcting Trends in Machine Learning*. 2018.

W4 E. Mathieu*, T. Rainforth*, N. Siddharth*, and Y. W. Teh.

Disentangling Disentanglement

In *NeurIPS Workshop on Bayesian Deep Learning*. 2018.

W3 N. Siddharth, B. Paige, J.-W. van de Meent, A. Desmaison, N. D. Goodman, P. Kohli, F. Wood, and P. H. S. Torr.

Inducing Interpretable Representations with Variational Autoencoders

In *NIPS Workshop on Interpretable Machine Learning in Complex Systems*. 2016.

W2 A. Barbu*, N. Siddharth*, and J. M. Siskind.

Language-Driven Video Retrieval

In *CVPR Workshop on Vision Meets Cognition*. 2014.

W1 N. Siddharth and N. D. Goodman.

Informative Scene Descriptions

In *CVPR Workshop on Language and Vision*. 2014.

Patents

P1 A. Barbu, N. Siddharth, H. Yu, and J. M. Siskind.

Correlating Videos and Sentences. U.S. pat. 9183466. Nov. 2015.

Invited Presentations

Multimodal Representation Learning	ICLR 2023 workshop (Virtual)	May 2023
Bayesflow Research Talk	Google Brain — Bayesflow (Virtual)	Jun 2022
Hybrid Artificial Intelligence	AAAI (Virtual)	Feb 2021
CAIDA Research Seminar	University of British Columbia	Dec 2019
International Multimodal Communication Centre (IMCC) Seminar	University of Oxford	Nov 2019
Psychology Research Seminar	University of Glasgow	Jan 2019
Seminar on Joint Processing of Language and Visual Data	Dagstuhl	Jan 2019
Foundations of Situated and Multimodal Communication	IWCS, Montepellier	Sept 2017
Artificial Intelligence and Natural Computation Seminar	University of Birmingham	May 2017
ATI Probabilistic Programming Workshop	Alan Turing Institute	Feb 2016
Artificial Intelligence and Natural Computation Seminar	University of Birmingham	Sept 2013
COGS Research Seminar	University of Sussex	Oct 2013
Machine Learning and Perception Seminar	Microsoft Research (Cambridge)	Oct 2013

Professional Services

Area Chair	NeurIPS, ICML
PC Member	IJCAI 2016
Reviewing	AAAI, CVPR, ICRA, ICDL, ICLR, ICML, IJCAI, NeurIPS • PAMI, IJCV, PRL
Workshops	Language and Vision Workshop — CVPR 2015, 2017, 2018, 2019 Learning Disentangled Representations — NIPS 2017

Teaching

IAML	Applied Machine Learning	School of Informatics, University of Edinburgh	2022 —
IAML	Introduction to Applied Machine Learning	School of Informatics, University of Edinburgh	2021 — 2022
DME	Data Mining and Exploration	School of Informatics, University of Edinburgh	2021
HDS-M02	Bayesian Modelling	Health Data Science (EPSRC CDT), University of Oxford	2019 — 2019
	Games Programming in C++	Coursework Module, Department of Engineering, University of Oxford	2016 — 2018
EE570	Artificial Intelligence	TA (Unofficial), Jeffrey Mark Siskind, Purdue University	2008 — 2012
EE473	Introduction to Artificial Intelligence	TA (Unofficial), Jeffrey Mark Siskind, Purdue University	2008 — 2012

Supervision

Mattia Opper	PhD [ongoing]
Magdalena Proszewska	PhD [ongoing]
Yuge Shi	DPhil 2023/Oxford [now at DeepMind]
Tom Joy	DPhil 2023/Oxford [now at Five AI (BOSCH)]