

Curriculum Vitae

Siddharth Narayanaswamy

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October 21, 2020

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Professional Experience

Reader in Explainable AI, School of Informatics, University of Edinburgh	Jul 2020 —
Safe & Ethical AI Research Fellow, The Alan Turing Institute	Nov 2019 —
Senior Researcher, Department of Engineering Science, University of Oxford	May 2019 — Jul 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 Thesis: Compositionality in Vision and Language	Aug 2008 — Mar 2014
Bachelor of Engineering (BE), Electronics & Communication, Anna University, India	Aug 2004 — Aug 2008

Grants & Fellowships

Facebook ParlAI Research Award 	Co-Investigator	Oct 2017 – Nov 2018
EPSRC MURI Grant EP/N019474/1 — Commonsense Visual Reasoning	Senior/Key personnel	Jan 2016 –

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. Murry, 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

- 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)*. Ed. by K. Chaudhuri and R. Salakhutdinov. Vol. 97. Proceedings of Machine Learning Research. PMLR, 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)*. Ed. by K. Chaudhuri and M. Sugiyama. Vol. 89. Proceedings of Machine Learning Research. PMLR, 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

- T6 Y. Shi, B. Paige, P. H. S. Torr, and N. Siddharth.
Relating by Contrasting: A Data-efficient Framework for Multimodal Generative Models
ArXiv e-prints, arXiv:2007.01179 (July 2020), arXiv:2007.01179. arXiv: [2007.01179](#) [cs.LG].
- T5 T. Joy, S. M. Schmon, P. H. S. Torr, N. Siddharth*, and T. Rainforth*.
Rethinking Semi-Supervised Learning in VAEs
ArXiv e-prints, arXiv:2006.10102 (June 2020), arXiv:2006.10102. arXiv: [2006.10102](#) [cs.LG].
- 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. Shangguan, 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

- 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

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

Journal Reviewer	PAMI, IJCV, PRL
Conference Reviewer	AAAI, CVPR, ICRA, ICDL, ICLR, ICML, IJCAI, NeurIPS
Co-Organiser	Language and Vision Workshop — CVPR 2015, 2017, 2018, 2019
Co-Organiser	Learning Disentangled Representations — NIPS 2017
PC Member	IJCAI 2016

Teaching

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

Yuge Shi	DPhil [ongoing]
Tom Joy	DPhil [ongoing]
Joanna Materzyńska	MSc Thesis: <i>A Semi-supervised Deep Generative Model for Human Action Recognition</i>