

# Sandeep Subramanian

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## EDUCATION

**UNIVERSITY OF MONTREAL** | PHD IN COMPUTER SCIENCE | 2016 - 2021 (EXPECTED)

Advisors: Christopher Pal & Yoshua Bengio | Montreal, QC, Canada

**CARNEGIE MELLON UNIVERSITY** | MS IN NATURAL LANGUAGE PROCESSING | 2014-2016

School of Computer Science | Pittsburgh, PA, USA

**VIT UNIVERSITY** | B.TECH IN COMPUTER SCIENCE & ENGINEERING | 2010 - 2014

School of Computer Science & Engineering | Vellore, India

## EXPERIENCE

**FACEBOOK AI RESEARCH** | RESEARCH INTERN | ADVISOR: MARC'AURELIO RANZATO

June 2018 – October 2018 | New York, NY, USA

- Worked on applications of Unsupervised Neural Machine Translation to controllable text generation & rewriting.

**MICROSOFT RESEARCH** | RESEARCH INTERN | ADVISOR: ADAM TRISCHLER

June 2017 – August 2017 | Montreal, Qc, Canada

- Worked on general purpose distributed representation learning for sentences & applications to transfer learning.
- Published at the International Conference on Learning Representations (ICLR 2018)

**MALUUBA MICROSOFT RESEARCH** | PART-TIME RESEARCH INTERN (20%) | ADVISOR: ADAM TRISCHLER

November 2016 – June 2018 | Montreal, QC, Canada

- Worked with Machine Reading Comprehension (MRC) team on Question Answering & Question Generation - published at the Association for Computational Linguistics (ACL) Conference Workshops (2017 & 2018).
- Worked on latent space generative models for text that leverage general purpose sentence representations - published at Neural Information Processing Systems (NIPS 2018).

**CARNEGIE MELLON UNIVERSITY** | GRADUATE RESEARCH ASSISTANT | ADVISOR: MADHAVI GANAPATHIRAJU

October 2014 – August 2016 | Pittsburgh, PA, USA

- Worked broadly on Biomedical Informatics with a focus on predicting and finding supporting information for protein-protein interactions from literature & analyzing DNA palindromes in the context of breast cancer mutations.

## RESEARCH PAPERS

**MULTI-ATTRIBUTE TEXT REWRITING** | [ICLR 2019 \(UNDER REVIEW\)](#)

[Sandeep Subramanian\\*](#), Guillaume Lample\*, Eric Smith, Ludovic Denoyer, Marc'Aurelio Ranzato, Y-Lan Boureau  
Application of Unsupervised Neural Machine Translation to controllable text generation & rewriting.

**FORTIFIED NETWORKS: IMPROVING THE ROBUSTNESS OF DEEP NETWORKS BY MODELING THE MANIFOLD OF HIDDEN REPRESENTATIONS** | [ICLR 2019 \(UNDER REVIEW\)](#)

Alex Lamb, Jonathan Binas, Anirudh Goyal, Dmitriy Serdyuk, [Sandeep Subramanian](#), Ioannis Mitliagkas, Yoshua Bengio

Defense against adversarial examples by "fortifying" layers using a denoising autoencoder at certain network layers that can signal off-manifold examples.

**TOWARDS TEXT GENERATION WITH ADVERSARIALLY LEARNED NEURAL OUTLINES** | [NIPS 2018](#)

[Sandeep Subramanian](#), Sai Rajeshwar, Alessandro Sordani, Adam Trischler, Aaron Courville, Christopher Pal  
Learning latent space generative models of text by modeling the distribution of induced by general purpose sentence encoders.

**LEARNING GENERAL PURPOSE DISTRIBUTED SENTENCE REPRESENTATIONS VIA LARGE SCALE MULTI-TASK LEARNING** | [ICLR 2018](#)

[Sandeep Subramanian](#), Adam Trischler, Yoshua Bengio, Christopher Pal

Multi-task training with diverse objectives results in general purpose distributed sentence representations useful for transfer learning

## NEURAL MODELS FOR KEYPHRASE EXTRACTION & QUESTION GENERATION | [ACL 2018 MRQA WORKSHOP](#)

**Sandeep Subramanian**, Tong Wang, Xingdi Yuan, Saizheng Zhang, Yoshua Bengio, Adam Trischler  
Generative modeling of Question / Answer pairs from Wikipedia documents using pointer networks & copy augmented sequence-to-sequence LSTMs.

## DEEP COMPLEX NETWORKS | [ICLR 2018](#)

Chiheb Trabelsi, Olexa Bilaniuk, Ying Zhang, Dmitriy Serdyuk, **Sandeep Subramanian**, João Felipe Santos, Soroush Mehri, Negar Rostamzadeh, Yoshua Bengio, Christopher J Pal  
Laying down some of the building blocks for building complex-valued neural networks.

## A DEEP REINFORCEMENT LEARNING CHATBOT | [NIPS 2017 DEMO & AMAZON ALEXA PRIZE](#)

Iulian V Serban, Chinnadhurai Sankar, Mathieu Germain, Saizheng Zhang, Zhouhan Lin, **Sandeep Subramanian**, Taesup Kim, Michael Pieper, Sarath Chandar, Nan Rosemary Ke, Sai Mudumba, Alexandre de Brebisson, Jose MR Sotelo, Dendi Suhubdy, Vincent Michalski, Alexandre Nguyen, Joelle Pineau, Yoshua Bengio  
MILA's submission to the Amazon Alexa Prize competition 2017. A reinforcement learning based dialog manager that learns chose between responses produced by different rule-based and deep learning systems.

## ADVERSARIAL GENERATION OF NATURAL LANGUAGE | [ACL 2017 REPL4NLP WORKSHOP](#)

**Sandeep Subramanian\***, Sai Rajeswar\*, Francis Dutil, Christopher Pal, Aaron Courville  
A baseline approach to generating discrete sequences of words with generative adversarial networks, circumventing discrete sampling.

## MACHINE COMPREHENSION BY TEXT-TO-TEXT NEURAL QUESTION GENERATION | [ACL 2017 REPL4NLP WORKSHOP](#)

Xingdi Yuan, Tong Wang, Caglar Gulcehre, Alessandro Sordani, Philip Bachman, **Sandeep Subramanian**, Saizheng Zhang, Adam Trischler  
Generating questions from a document of text conditioned on an given answer. Generated questions are controlled in certain ways using rewards specified via reinforcement learning.

## NEURAL ARCHITECTURES FOR NAMED ENTITY RECOGNITION | [NAACL 2016](#)

Guillaume Lample, Miguel Ballesteros, **Sandeep Subramanian**, Kazuya Kawakami, Chris Dyer  
Bidirectional LSTM-CRFs & Stack LSTMs with learnable character-level features for sequence-labeling.

## A PILOT STUDY ON THE PREVALENCE OF DNA PALINDROMES IN BRESAT CANCER GENOMES | [BMC MEDICAL GENOMICS](#)

**Sandeep Subramanian**, Srilakshmi Chaparala, Viji Avali, Madhavi K Ganapathiraju  
Computational analysis of the impact of DNA palindrome breaking & formation on breast cancer with analysis from TCGA and the 1000 Genomes Project.

## MISC

### COURSEWORK

#### University of Montreal

Probabilistic Graphical Models (IFT-6269) • Deep Learning (IFT-6266)

#### Carnegie Mellon University

Machine Learning (10-701) • Natural Language Processing (11-711) •  
Machine Translation (11-731) • Multimodal Machine Learning (11-777)

#### VIT University

Data Structures & Algorithms • Linear Algebra • Probability & Statistics

### CONFERENCE REVIEWING

NIPS 2017 • ICML 2018 • NIPS 2018

### INVITED TALKS

#### VIT University

Introduction to Deep Learning

#### IBM Research

Neural Models for keyphrase extraction &  
question generation

#### MILA, University of Montreal

PyTorch Tutorial - [https://github.com/mila-udem/welcome\\_tutorials/tree/master/pytorch](https://github.com/mila-udem/welcome_tutorials/tree/master/pytorch)

NYU NLP Reading Group

Learning & Modeling General Purpose

Sentence Representations