

# LIAM DUGAN

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Research Interests  
**Applying NLP to Education**  
Machine Translation  
Dialogue Systems  
Text Generation

## EDUCATION

### **M. S. E., Robotics, University of Pennsylvania, 2017-2020 – GPA: 3.78**

Thesis: *Learning Politeness from Japanese-English Parallel Corpora*  
Advisors: Chris Callison-Burch, Ph.D., Camillo Jose Taylor, Ph.D.

### **B. S. E., Computer Engineering, University of Pennsylvania, 2015-2020 – GPA: 3.63**

Second Major: East Asian Languages and Civilizations – Japanese Concentration  
Advisors: Boon Thau Loo, Ph.D., David Spafford, Ph.D.

### **Study Abroad, Doshisha University, 2017 – GPA: 3.70**

Program: Kyoto Consortium of Japanese Studies (KCJS)

## PUBLICATIONS

**Dugan, L.\***, Ippolito, D.\*, Kirubarajan A.\*, Callison-Burch, C. (*Preprint*). “RoFT: A Tool for Evaluating Human Detection of Machine-Generated Text” *Annual Conference on Empirical Methods in Natural Language Processing (EMNLP 2020)*

Luo, Z., Small, A., **Dugan, L.**, Lane, S. (2019). “Cloud Chaser: real time deep learning computer vision on low computing power devices” *Eleventh International Conference on Machine Vision (ICMV 2018)*

## RESEARCH EXPERIENCE

### **Graduate Research Assistant, University of Pennsylvania, 2019-2020**

Worked with Dr. Chris Callison-Burch on: human evaluation of text generation models, machine translation + word alignment for cross-lingual information extraction, and semi-supervised formality estimation with parallel corpora

### **Undergraduate Research Assistant, University of Pennsylvania, 2018**

Worked with Dr. Boon Thau Loo and Nik Sultana on DeDOS, a project to mitigate distributed denial-of-service attacks.

## WORK EXPERIENCE

### **Software Engineering Intern, NVIDIA Corporation, Santa Clara CA, 2019**

Assisted development of platform to pre-install software and flash car hardware within an on-demand docker container through a Jenkins server. Deployed to over 500 developers

### **Software Engineering Intern, Robotic Research LLC, Clarksburg MD, 2018**

Worked with Velodyne VLP-16 LIDAR at driver level developing and prototyping novel object classifiers for sun speckles, dust, and vegetation—requiring extensive paper surveys.

### **TEACHING EXPERIENCE**

(Fall 2020) Computational Linguistics **Head TA** (CIS530), 150 Students

(Spring 2020) Computational Linguistics TA (CIS530), 150 Students

(Fall 2019) Operating Systems **Head TA** (CIS380), 150 Students

(Fall '18, Spr. '19) Operating Systems TA (CIS380), 150 Students

(Spr. '18, Fall '17, Spr. '17) Intro to Computer Architecture TA (CIS240), 150 Students

### **PROJECTS & PRESENTATIONS**

(April 2020) “[Learning to Trick Humans](#)” Presented an annotation framework and error classification taxonomy to diagnose common mistakes made in machine-generated text.

(March 2020) “[HW10: Neural Machine Translation](#)” Co-authored a homework assignment for graduate Computational Linguistics class that tasked students with developing a Japanese to English Neural Machine Translation system using OpenNMT.

(December 2019) “**Semi-Formal**” Achieved 2% improvement over SOTA sentence formality classification by leveraging Japanese-English parallel corpora to train a BERT model. Work currently being adapted into a Master’s Thesis

(October 2019) “**Page Replacement Algorithms**” Lecture given to undergraduate Operating Systems course covering Belady’s anomaly, second chance replacement, and the Linux page replacement policy.

(May 2019) “[Scene++](#)” Presented a method for feasibly adding computer vision to AR/VR environments *without* incurring nauseating performance drops. Won 3rd Place in Computer Science Senior Design. Qualified for one of 15 spots in the school-wide competition.

(December 2018) “[RTX-Explore](#)” Presented the first open source Path Tracer built within the new DirectX Raytracing (DXR) Graphics API. Our github [repository](#) has over 40 stars.

(December 2018) “人間より良い：なぜロボットは仕事を奪う” Presented my translation of the WIRED article “Better Than Human: Why Robots Will – And Must – Take Our Jobs” for Japanese-English Translation class.

(January 2018) “[Cloud Chaser](#)” Presented our platform for offloading computer vision tasks to cloud servers to allow low powered robots to do high level inference. Won Grand

Prize and Best use of Cloud Computing at PennApps XVII. The paper outlining our techniques which was accepted to ICMV 2018. (News Article [#1](#) [#2](#))

(September 2017) “[Todd: The Interdimensional Robot](#)” Presented our idea of pairing elements from the real and virtual world for a new type of multiplayer game experience by linking Arduino and Unity3D. Won 3<sup>rd</sup> Prize at PennApps XVI.

(August 2017) “[自動運転](#)” Talk given in Japanese at Doshisha University (同志社大学) as part of the Kyoto Consortium of Japanese Studies on the rate of adoption of Self-Driving cars in Japanese Society.

(May 2017) “[Fix Yourself](#)” Presented a low power posture tracker device that attaches to a user’s back, vibrates when posture is off, and transmits posture data to a web server. This idea would later be taken separately to market by startups such as Upright and Lumo Lift.

### **GRANTS AND FELLOWSHIPS**

Foreign Language and Area Studies Undergraduate Fellowship -- Japanese (2018-19)

### **AWARDS, HONORS, CERTIFICATIONS**

(August 2020) Certificate of Japanese Proficiency

(May 2020) Penn Engineering Exceptional Service Award

(May 2019) 3<sup>rd</sup> place -- Computer Science Senior Design competition

(May 2018) Dean’s List 2017-2018

(January 2018) Japanese Language Proficiency Test: N2

(January 2018) 1<sup>st</sup> place & Best use of Cloud Hosting -- PennApps XVII

(September 2017) 3<sup>rd</sup> place -- PennApps XVI

(May 2017) Dean’s List 2016-2017

### **TECHNICAL SKILLS**

Programming: Python, C++, C, PyTorch, CUDA, Java, Javascript, bash, Docker, ROS, PCL, MATLAB, Go, OpenCV, OpenGL, Vulkan, WebGL, DXR, Verilog, React, Node

### **REFERENCES**

**Boon Thau Loo**, RCA Prof. of Comp. Sci.  
Director – Distributed Systems Lab  
University of Pennsylvania  
[boonloo@seas.upenn.edu](mailto:boonloo@seas.upenn.edu)

**Chris Callison-Burch**, Assoc. Prof of Comp. Sci.  
Natural Language Processing  
University of Pennsylvania  
[ccb@upenn.edu](mailto:ccb@upenn.edu)