

# Ryan Szeto

Graduate Student Research Assistant

## Research Areas

Computer vision, video inpainting, generative video models, deep learning, machine learning




## Programming

PyTorch	●●●●●
TensorFlow	●●●●●
OpenCV	●●●●●
Caffe	●●●●●
Python	●●●●●
Bash	●●●●●
MATLAB	●●●●●
JavaScript	●●●●●

## Address

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## Web

	ryanszeto.com
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	rszeto

## Education

<b>University of Michigan</b>	Ann Arbor, MI
Ph.D. in Computer Science and Engineering	Sep 2015 – May 2021 (expected)
M.S. in Computer Science and Engineering	Sep 2015 – Aug 2017
<b>University of Massachusetts</b>	Amherst, MA
B.S. in Computer Science	Sep 2011 – May 2015
B.S. in Mathematics	Sep 2011 – May 2015

## Publications

Ryan Szeto, Ximeng Sun, Kunyi Lu, and Jason J. Corso. "A Temporally-Aware Interpolation Network for Video Frame Inpainting." *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2020.

Ximeng Sun\*, Ryan Szeto\*, and Jason J. Corso. "A Temporally-Aware Interpolation Network for Video Frame Inpainting." *Asian Conference on Computer Vision*, 2018.

Ryan Szeto, Simon Stent, German Ros, and Jason J. Corso. "A Dataset To Evaluate The Representations Learned By Video Prediction Models." *International Conference on Learning Representations (Workshop Track)*, 2018.

Ryan Szeto and Jason J. Corso. "Click Here: Human-Localized Keypoints as Guidance for Viewpoint Estimation." *IEEE International Conference on Computer Vision*, 2017.

Paul E. Dickson, Chris Kondrat, Ryan B. Szeto, W. Richards Adrion, Tung T. Pham, and Tim D. Richards. "Portable Lecture Capture That Captures the Complete Lecture." *IEEE International Symposium on Multimedia*, 2015.

Ellysha Raelen Recto, Brendan Murphy, Ryan Szeto, and Tung Pham. "PAOL and Lecture-Viewer." *ASEE Zone 1 Conference*, 2014.

## Awards and Distinctions

<b>NSF Graduate Research Fellowship – Honorable Mention</b> <i>National Science Foundation</i>	2017
<b>Outstanding Achievement in Artificial Intelligence Award</b> <i>UMass School of Computer Science</i>	2015
<b>Honors Dean's Award for Outstanding Honors Thesis</b> <i>UMass Commonwealth Honors College</i>	2015
<b>Honors Research Grant – \$1000</b> <i>UMass Commonwealth Honors College</i>	2014
<b>Phi Beta Kappa</b> <i>Phi Beta Kappa</i>	2014

Research Assistant Fellowship — \$500

UMass Commonwealth Honors College

2013

Cisco Award for Outstanding Achievement

UMass School of Computer Science

2012

## Research and Industrial Experience

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### Graduate Student Research Assistant

Vision and Robotics Lab, University of Michigan

Advisor: Prof. Jason J. Corso

Ann Arbor, MI

Sep 2015 – present

- *Video Frame Inpainting.* We proposed a deep learning solution to video frame inpainting composed of a bidirectional prediction module and a temporally-aware frame blending module. Our approach produces more accurate and qualitatively satisfying results than prior techniques in video inpainting, frame interpolation, and video prediction.
- *Viewpoint Estimation with Human Guidance.* Our Click-Here CNN estimates the location of the camera relative to an object by using a 2D image and the location of a semantic keypoint on the image, provided by a human, as guidance. Our evaluation demonstrated that keypoint information can help models obtain better viewpoint estimates than those that only use information from the image.

### Assistant Engineer, Machine Learning Intern

Samsung Semiconductor, Inc.

Mentor: Dr. Mostafa El-Khamy

San Diego, CA

May 2019 – Aug 2019

- *Hyperconsistency for Video-to-Video Translation Tasks.* We proposed hyperconsistency, an image-to-video model transfer approach for video-to-video translation tasks that interpolates frames, translates them frame-wise, and aggregates them to produce a temporally-consistent result. Our method reduces flickering effects more reliably than prior video consistency work, and yields more realistic predictions than prior video inpainting techniques.

### Research Intern

Toyota Research Institute

Mentor: Dr. Simon Stent

Cambridge, MA

Jun 2017 – Sep 2017

- *Evaluating the Generality of Video Prediction Models.* We investigated the robustness of existing video prediction models to unseen objects and rates of motion. Our experiments revealed that during prediction, certain models reconstruct objects seen during training at inference time, and all that tested models fail to generalize to faster rates of motion.

### Software Engineering Intern

IBM

Littleton, MA

May 2015 – Aug 2015

- *IBM Guardium.* Designed and implemented an interface to manage permissions through an access manager, and reduced page load times by 80% by consolidating remote database queries.

### Undergraduate Research Assistant

RIPPLES Lab, University of Massachusetts

Advisors: Prof. Rick Adrion, Prof. Paul Dickson

Amherst, MA

Jan 2013 – May 2015

- *Presentations Automatically Organized from Lectures.* Implemented a portable lecture capture system that processes video feeds of the lecturer, the whiteboard, and the computer screen in real-time.
- *Honors Thesis: Whiteboard Marker Detection.* Proposed a real-time whiteboard marker segmentation algorithm that generates marker stroke candidates by connecting components from a Difference-of-Gaussians edge detector, then filtering them with a sparse stroke detector.

### Software Engineering Intern

The MathWorks, Inc.

Natick, MA

May 2014 – August 2014

- *MATLAB Online.* Improved the Variable Editor by writing QUnit tests and implementing cut/copy/paste functionality.

### Undergraduate Research Assistant

Center for e-Design, University of Massachusetts

Advisors: Prof. Jack Wileden, Prof. Sundar Krishnamurthy

Amherst, MA

Jan 2012 – Dec 2012

- *Computer-Aided Design (CAD) Data Exchange.* Developed a system that translated CAD part files between PTC Creo and SolidWorks while preserving dimensions and constraints by following a translation protocol inspired by programming language theory.

## Teaching Experience

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<b>Graduate Student Instructor for EECS 542: Advanced Topics in Computer Vision</b> <i>University of Michigan, Department of Electrical Engineering and Computer Science</i>	Sep 2020 – Dec 2020
<b>Grader for CMPSCI 670: Graduate Computer Vision</b> <i>University of Massachusetts, School of Computer Science</i>	Sep 2014 – Dec 2014
<b>Grader for CMPSCI 220: Programming Methodology</b> <i>University of Massachusetts, School of Computer Science</i>	Jan 2012 – Dec 2012

## Academic Service

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Student reviewer for International Conference on Machine Learning (ICML)	2018
Student reviewer for IEEE Conference on Computer Vision and Pattern Recognition (CVPR)	2018
Student reviewer for Robotics and Autonomous Systems (RAS)	2017
Student reviewer for IEEE International Conference on Robotics and Automation (ICRA)	2016

## Mentorship Experience

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<b>Vision and Robotics Lab, University of Michigan</b>	Jun 2016 – Aug 2016
<ul style="list-style-type: none"><li>• <i>Vehicle Crash Analysis</i>. Mentored three U-M undergraduate students by helping them conduct summer-long projects related to object tracking, annotation collection, and physical simulations, as well as prepare written progress reports and oral presentations to their project sponsors.</li></ul>	