

# RYAN SZETO

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## CONTACT INFORMATION

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University of Michigan  
Electrical Engineering and Computer Science  
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## RESEARCH INTERESTS

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Computer vision, deep learning, multimodal learning, natural language processing

## EDUCATION

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<b>Ph.D. in Computer Science and Engineering</b> <i>University of Michigan</i>	September 2015 – present Ann Arbor, MI
<b>M.S. in Computer Science and Engineering</b> – GPA: 3.73 <i>University of Michigan</i>	September 2015 – August 2017 Ann Arbor, MI
<b>B.S. in Computer Science</b> – GPA: 3.97 <i>University of Massachusetts</i>	September 2011 – May 2015 Amherst, MA
<b>B.S. in Mathematics</b> – GPA: 3.97 <i>University of Massachusetts</i>	September 2011 – May 2015 Amherst, MA

## RESEARCH EXPERIENCE

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<b>Risk Aware Planning and Control</b> <i>Toyota Research Institute</i>	June 2017 – September 2017 Cambridge, MA
<ul style="list-style-type: none"><li>• <i>Video Prediction Analysis.</i> Many video prediction models have been proposed, but little work has been done to evaluate their ability to model the motion primitives that make up complex videos. We propose an extension of the Moving MNIST dataset where the user controls the parameters used to sample the motion and objects in the dataset, and use it to benchmark existing video prediction models by evaluating their ability to learn translation, rotation, and scaling dynamics, as well as generalize to unseen dynamics and objects.</li><li>• Advisors: Dr. Simon Stent, Dr. German Ros</li></ul>	
<b>Vision and Robotics Lab</b> <i>University of Michigan</i>	September 2015 – present Ann Arbor, MI
<ul style="list-style-type: none"><li>• <i>Viewpoint Estimation with Minimal Human Guidance.</i> For viewpoint estimation, human guidance can be used to help otherwise automatic systems deal with certain visual challenges, such as occlusion, truncation, and symmetrical ambiguity, that humans overcome easily. We propose the use of a Convolutional Neural Network that takes a 2D image, as well as the location of a semantic keypoint, and predicts the viewpoint by integrating both sources of information.</li><li>• Advisor: Prof. Jason Corso</li></ul>	
<b>Research in Presentation Production for Learning Electronically (RIPPLES)</b> <i>University of Massachusetts</i>	January 2013 – May 2015 Amherst, MA
<ul style="list-style-type: none"><li>• <i>Presentations Automatically Organized from Lectures (PAOL).</i> PAOL is a system that captures all relevant components of a lecture with inexpensive devices, regardless of the lecturer's style of teaching. Video frames of the whiteboard and computer screen are processed in near-real time to remove the lecturer and improve the legibility of the content.</li><li>• <i>Thesis: Whiteboard Marker Detection.</i> Prior marker detection algorithms fail to capture coherent strokes in images captured from webcams in low-light conditions. The proposed method uses the Difference of Gaussians</li></ul>	

edge detector and connected components to detect potential marker strokes, then filters the strokes with a custom edge detector to produce an accurate marker stroke map.

- Advisors: Prof. Rick Adrion, Prof. Paul Dickson, Dr. Tim Richards

### Center for e-Design

January 2012 – December 2012

University of Massachusetts

Amherst, MA

- *Computer-Aided Design (CAD) Data Exchange*. The CAD Data Exchange system allows users to convert PTC Creo models to SolidWorks and edit the output, which is not possible through popular CAD data standards. The system implements a theoretical approach that defines a formal grammar for models of each CAD system, as well as translations between the languages.
- Advisors: Prof. Jack Wileden, Prof. Sundar Krishnamurthy

## CONFERENCE PUBLICATIONS

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- **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, Tim D. Richards. Portable Lecture Capture that Captures the Complete Lecture. *IEEE International Symposium on Multimedia, 2015*.
- Ellysha Raelen Recto, Brendan Murphy, **Ryan Szeto**, Tung Pham. PAOL and Lecture-Viewer. *ASEE Zone 1 Conference, 2014*.

## INDUSTRIAL EXPERIENCE

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### IBM

Littleton, MA

Software Engineering Intern

May 2015 – August 2015

- Contributed to the IBM Guardium code base by adding features and fixing bugs
- Designed and implemented an interface to manage permissions through an access manager
- Reduced page loading times by 80% by consolidating remote database queries

### The MathWorks, Inc.

Natick, MA

Software Engineering Intern

May 2014 – August 2014

- Converted JavaScript unit tests from the Dojo Objective Harness framework to QUnit
- Added cut, copy, and paste functionality to the Variable Editor for MATLAB Online

## AWARDS AND DISTINCTIONS

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NSF Graduate Research Fellowship – Honorable Mention	Spring 2017
Dean's List	Fall 2011 – Spring 2015
UMass CS Outstanding Achievement in Artificial Intelligence Award	Spring 2015
Honors Dean's Award	Spring 2015
Course Commendation in CMPSCI 585: Natural Language Processing	Fall 2014
Honors Research Grant from Commonwealth Honors College (\$1000)	Fall 2014
Phi Beta Kappa	Spring 2014
Research Assistant Fellowship from Commonwealth Honors College (\$1000)	Fall 2013
Cisco Award for Outstanding Achievement	Fall 2012
William Lowell Putnam Exam, participant	Fall 2012
Course Commendation in CMPSCI 240: Reasoning Under Uncertainty	Fall 2012
Jacob-Cohen-Killam Mathematics Competition, Fourth Place	Spring 2012
Course Commendation in CMPSCI 250: Discrete Mathematics	Spring 2012
Course Commendation in CMPSCI 220: Programming Methodology	Fall 2011

## TEACHING EXPERIENCE

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Grader for CMPSCI 670: Graduate Computer Vision	September 2014 – December 2014
Grader for CMPSCI 220: Programming Methodology	January 2012 – December 2012

## ACADEMIC SERVICE

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Reviewer for IEEE International Conference on Robotics and Automation (ICRA)

November 2016

## MENTORSHIP EXPERIENCE

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### **Vision and Robotics Lab**

June 2016 – August 2016

*University of Michigan*

- *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. I also helped them prepare written progress reports and oral presentations to their project sponsors.

## PROGRAMMING SKILLS

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**Languages:** Python, MATLAB, JavaScript, Bash, Java, C, C++

**Software:** TensorFlow, Caffe, OpenCV, Dojo, React.js, Node.js, Android

**Operating systems:** Windows, Ubuntu