# Richard Zhang

Email (rizhang@adobe.com) • Homepage • GitHub • Scholar
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**RESEARCH SUMMARY**

My research interests are in computer vision, deep learning, and graphics. More specifically, I am interested in using deep networks for image synthesis, as well as unsupervised learning and generative modeling.

**RESEARCH EXPERIENCE**

**Adobe Research**
*Research Scientist*, San Francisco, CA — May 2018 – Present
*Research Intern*, Seattle, WA — May – Aug 2017

**University of California, Berkeley**, *Graduate Student Researcher*, Berkeley, CA
- Computer Vision Group, PI: Prof. Alexei A. Efros — Jan 2015 – May 2018
- Video & Image Processing Lab, PI: Prof. Avideh Zakhor — Aug 2012 – Dec 2014

**EDUCATION**

**University of California, Berkeley**, Berkeley, CA
- Ph.D. in Electrical Engineering and Computer Sciences (EECS) — Aug 2012 – May 2018
  - Thesis: Image Synthesis for Self-Supervised Visual Representation Learning
  - Advisor: Prof. Alexei A. Efros

**Cornell University**, Ithaca, NY
- M.Eng. in Electrical & Computer Engineering (ECE) — Aug 2009 – May 2010
  - Cumulative GPA: 4.13 / 4.30
- B.S. in Electrical & Computer Engineering (ECE) — Aug 2006 – Dec 2009
  - Cumulative GPA: 4.02 / 4.30
  - Summa Cum Laude, Dean's List all semesters

**PUBLICATIONS**

**CONFERENCE**

[13] S. Wang, O. Wang, R. Zhang, A. Owens, A. A. Efros. ***CNN-generated images are surprisingly easy to spot...for now.*** In *CVPR*, 2020 (oral presentation).

[12] D. Smirnov, M. Fisher, V. Kim, R. Zhang, J. Solomon. ***Deep Parametric Shape Predictions using Distance Fields.*** In *CVPR*, 2020.

[11] N. Fish, R. Zhang, L. Perry, D. Cohen-Or, E. Shechtman, C. Barnes. ***Image Morphing with Perceptual Constraints and STN Alignment.*** In *CGF*, 2020.

[10] S. Wang, O. Wang, A. Owens, R. Zhang, A. A. Efros. ***Detecting Photoshopped Faces by Scripting Photoshop.*** In *ICCV*, 2019.

[9] A. Ghosh, R. Zhang, P. K. Dokania, O. Wang, A. A. Efros, P. H.S. Torr, E. Shechtman. ***Interactive Sketch & Fill: Multiclass Sketch-to-Image Translation.*** In *ICCV*, 2019.

[8] R. Zhang. ***Making Convolutional Networks Shift-Invariant Again.*** In *ICML*, 2019.

[7] R. Zhang, P. Isola, A. A. Efros, E. Shechtman, O. Wang. ***The Unreasonable Effectiveness of Deep Features as a Perceptual Metric.*** In *CVPR*, 2018.

[6] J.Y. Zhu, R. Zhang, D. Pathak, T. Darrell, A. A. Efros, O. Wang, E. Shechtman. ***Toward Multimodal Image-to-Image Translation.*** In *NIPS*, 2017.

[5] R. Zhang*, J.Y. Zhu*, P. Isola, X. Geng, A. S. Lin, T. Yu, A. A. Efros. ***Real-Time User-Guided Image Colorization with Learned Deep Priors.*** In *SIGGRAPH*, 2017. (*equal contribution)

[4] R. Zhang, P. Isola, A. A. Efros. ***Split-Brain Autoencoders: Unsupervised Learning by Cross-Channel Prediction.*** In *CVPR*, 2017.

[3] R. Zhang, P. Isola, A. A. Efros. ***Colorful Image Colorization.*** In *ECCV*, 2016 (oral presentation).

[2] R. Zhang, S. Candra, K. Vetter, A. Zakhor. ***Sensor Fusion for Semantic Segmentation for Urban Scenes.*** In *ICRA*, 2015.

[1] R. Zhang and A. Zakhor. ***Automatic Identification of Window Regions on Indoor Point Clouds Using LiDAR and Cameras.*** In *WACV*, 2014.

**PREPRINT**

[iii] P. Manocha, A. Finkelstein, Z. Jin, N. J. Bryan, R. Zhang, G. J. Mysore. ***Transforming and Projecting Images to Class-conditional Generative Networks.*** In *ArXiv*, 2020.

[ii] M. Huh, R. Zhang, J.Y. Zhu, S. Paris, A. Hertzmann. ***Transforming and Projecting Images to Class-conditional Generative Networks.*** In *ArXiv*, 2020.

[i] A.X. Lee, R. Zhang, F. Ebert, P. Abbeel, C. Finn, S. Levine. ***Stochastic Adversarial Video Prediction.*** In *ArXiv*, 2018.

## AWARDS

**Paper Reviewing Recognitions**

- NeurIPS, top 50% reviewer — Dec 2019
- CVPR, outstanding reviewer — Jul 2019

**Best Presentation Award**, SIGGRAPH Thesis Fast Forward — Jul 2018

**Adobe Research Fellowship** — Jan 2017

**William S. Einwechter Award**, Cornell University — May 2010

- Presented to an outstanding senior who demonstrated distinguished record of service to School of ECE, College of Engineering and the university while maintaining academic performance

## COMMUNITY SERVICE

**AREA CHAIR**

Computer Vision and Pattern Recognition (CVPR) — 2020

**PAPERS REVIEWED**

| | |
|---|---|
| Computer Vision and Pattern Recognition (CVPR) | 2018, 2019 |
| European Conference on Computer Vision (ECCV) | 2016, 2018, 2020 |
| International Conference on Computer Vision (ICCV) | 2017, 2019 |
| Neural Information Processing Systems (NIPS, NeurIPS) | 2016, 2017, 2018, 2019 |
| International Conference in Machine Learning (ICML) | 2019, 2020 |
| Special Interest Group in Graphics (SIGGRAPH) | 2017, 2018, 2019 |
| Special Interest Group in Graphics, Asia (SIGGRAPH Asia) | 2017, 2018, 2019 |
| International Conference on Robotics and Automation (ICRA) | 2015, 2018 |
| International Journal of Computer Vision (IJCV) | 2019 |
| Transactions in Pattern Analysis and Machine Intelligence (TPAMI) | 2018 |
| Transactions in Image Processing (TIP) | 2017, 2018 |
| Technical Committee on Vision and Graphics (TCVG) | 2018 |
| Pacific Graphics | 2018 |
| Eurographics | 2019 |

**WORKSHOP ORGANIZATION COMMITTEE**

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|---|---|
| Advancements in Image Manipulation (AIM), at ICCV 2019 | Nov 2019 |
| New Trends in Image Restoration and Enhancement (NTIRE), at CVPR 2019 | Jul 2019 |

## SELECTED PUBLICITY

| | |
|---|---|
| Adobe MAX (Sneak Peek). *Project About Face.* | Nov 2019 |
| The Verge. *Adobe's prototype AI tool automatically spots Photoshopped faces.* | Jun 2019 |
| The New Yorker. *In the Age of A.I., Is Seeing Still Believing?* | Nov 2018 |
| Gizmodo. *AI-Powered Software Makes It Incredibly Easy to Colorize Black and White Photos.* | May 2017 |
| UK Times. *Computers give the past a blast of colour.* | Apr 2016 |
| Reddit (front page). *Use deep learning algorithms to add color to black and white images.* | Jun 2016 |
| TechCrunch. *This neural network 'hallucinates' the right colors into black and white pictures.* | Mar 2016 |

## INVITED PRESENTATIONS

***Analyzing CNN Artifacts in Discriminative and Generative Models***

CVPR AC Workshop — Mar 2020

***Making Convolutional Networks Shift-Invariant Again***

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|---|---|
| Berkeley AI Research (BAIR) Seminar | Aug 2019 |
| International Conference on Machine Learning (ICML) | Jun 2019 |
| Google Research, Cambridge, MA | May 2019 |

***Modeling Perceptual Similarity and Shift-Invariance in Deep Networks***

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|---|---|
| NAVER Labs, Tech talk | Oct 2019 |
| University College London, Smart Geometry Processing Group seminar | Oct 2019 |
| Oxford University, VGG seminar | Oct 2019 |
| Scale.AI, seminar talk | Aug 2019 |

Toyota Technological Institute of Chicago (TTIC), Young Researcher Talk — May 2019
Massachusetts Institute of Technology (MIT), Computer Vision Seminar — Apr 2019

***Deep Learning for Content Synthesis***
Association for Content Editors (ACE) Tech Day with Adobe — Sep 2019
Hollywood Professional Association (HPA) Tech Retreat — Feb 2019

***Image Synthesis for Self-Supervised Visual Representation Learning***
Stanford University, Graphics Group; University of Michigan, Computer Vision Group — Jan 2019
Berkeley Special Topics in Deep Learning Seminar, CS 294-131 — Nov 2018
SIGGRAPH 2018 Thesis Fast Forward (3 min) — Jul 2018
Berkeley AI Research (BAIR) Seminar, Dissertation Talk — Apr 2018
Alibaba Research; Amazon AI Deep Learning; DeepScale; Facebook AML; Fyusion; Google Research; Intel Intelligent Systems; NVIDIA Research — Mar 2018
Adobe Research; Allen Institute for AI (AI2); Amazon A9; Apple Turi; eBay Research; Snap Research; WaveOne — Feb 2018

***Multimodal Image-to-Image Translation***
University of Washington, Graphics and Imaging Lab (GRAIL) — Jul 2018

***Real-Time User-Guided Image Colorization with Learned Deep Priors***
Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH) — Aug 2017
NVIDIA SIGGRAPH Innovation Theater — Aug 2017

***Cross-Channel Visual Prediction***
Graphics and Mixed Environment (GAMES) Webinar — Oct 2017
Global AI Hackathon Webinar — Jun 2017
Berkeley AI Research (BAIR) Seminar — Apr 2017

***Colorful Image Colorization***
Berkeley AI Research (BAIR) Seminar — Sep 2017
European Conference on Computer Vision (ECCV) — Oct 2016
Oxford University; INRIA Paris; INRIA Sophia Antipolis; École des Ponts ParisTech — Jun 2016

***Sensor Fusion for Semantic Segmentation for Urban Scenes***
Berkeley Deep Drive (BDD) Kickoff — Mar 2016
Amazon Computer Vision PhD Symposium — Oct 2015
International Conference on Robotics and Automation (ICRA) — Mar 2015

***Automatic Identification of Window Regions on Indoor Point Clouds Using LiDAR and Cameras***
Winter Conference on Applications of Computer Vision (WACV) — May 2014
Microsoft Research (MSR) Computer Vision Group — Jan 2014

## TEACHING EXPERIENCE

**Berkeley EECS Department**
- CS 188 Intro to Artificial Intelligence, *Graduate Student Instructor* — Jan – May 2017
  - Instructor: Prof. Anca Dragan
- CS 280 Computer Vision, *Graduate Student Instructor* — Jan – May 2016
  - Instructor: Prof. Alexei A. Efros

**Cornell ECE Department**
- ECE 2100 Intro to Circuits, *Teaching Assistant* — Jan – May 2010
  - Instructor: Prof. Alyosha Molnar
- ECE 2100 Intro to Circuits, *Course Assistant* — Aug – Dec 2008
  - Instructor: Prof. John Belina

## VOLUNTEER EXPERIENCE

**Berkeley AI Research (BAIR) Mentorship Program**, *Mentor* — Aug – Dec 2017
**Illinois Math and Science Academy (IMSA)**, *Computer Vision Intersession Leader* — Jan 2014
**Clarksville Middle School**, Howard County Public School System, *Volunteer* — Dec 2010 – May 2011

## INDUSTRY EXPERIENCE

**Johns Hopkins University Applied Physics Laboratory (JHU/APL)**, Laurel, MD — Jul 2010 – Jul 2012
- Missile Defense Radar Engineering Group, Air & Missile Defense Dept (AMDD), *Staff Engineer*
- Electro-Optical & Infrared Systems and Technologies Group, AMDD

**SKILLS** Python, PyTorch, Caffe, GitHub, LaTeX

**LANGUAGES** **Chinese (Mandarin)** – Conversational