

Kristina Monakhova

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Education

University of California, Berkeley

PH.D. CANDIDATE IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCES

- Advisor: Prof. Laura Waller

Berkeley, CA

2016 - 2022 (expected)

The State University of New York at Buffalo

BS, ELECTRICAL ENGINEERING, TECHNICAL GPA: 4.00 / 4.00

Buffalo, NY

2012 - 2016

Research Focus

My research involves combining computational imaging with machine learning to make small, cheap, and capable task-specific cameras. My work is at the intersection of signal processing, optics, optimization, compressive sensing, and machine learning. I've worked on speeding up inverse problems using unrolled optimization, single-shot 3D microscopy, and I'm currently working on on-chip compressive hyperspectral imaging.

Keywords: signal processing, optics, inverse problems, compressive sensing, optimization, machine learning

Experience

Berkeley Artificial Intelligence Research (BAIR) , Research Assistant in Prof. Laura Waller's group	2017-present
Intel Intelligent Systems Lab , graduate researcher with Vladlen Koltun	spring 2021
MIT Lincoln Laboratory , Advanced Sensor Systems and Test Beds Intern	summer 2016
University at Buffalo Nanosatellite Laboratory , undergrad researcher with Dr. Crassidis	2012-2016
Northrop Grumman Electronic Systems , hardware engineering winter intern	winter 2015
Northrop Grumman Aerospace Systems , systems engineering summer intern	summer 2015
Carnegie Mellon Robotics Institute , RISS REU with Dr. Red Whittaker	summer 2014
NASA Marshall Space Flight Center , NASA Robotics Academy summer researcher	summer 2013

Academic Honors & Awards

UC Berkeley EECS Chairs' Graduate Award	2020
UC Berkeley EECS Excellence Award	2016
National Science Foundation Graduate Research Fellowship (NSF GRFP)	2016
National Defense Science and Engineering Graduate Fellowship (NDSEG) , (declined for NSF GRFP)	2016
Barry M. Goldwater Scholarship	2015
University at Buffalo Presidential Scholarship , four year full-ride scholarship	2012 - 2016

Teaching

GRADUATE TEACHING ASSISTANT, UC BERKELEY

EE16A - Designing Information Devices and Systems I	Fall 2020
Discussion TA, lead interactive discussion sections over Zoom.	
EE16A - Designing Information Devices and Systems I	Summer 2020
Content development - adapted single-pixel imaging lab for remote instruction.	
EE290T - High dimensional data analysis with low dimensional models	Fall 2018
Created jupyter notebook-based programming assignments and interactive lab discussions for new graduate class on compressive sensing and low-rank models. Gave bi-weekly discussion section and taught one lecture.	

Publications

*indicates equal contribution

JOURNAL PUBLICATIONS

1. **Kristina Monakhova***, Vi Tran*, Grace Kuo, Laura Waller, “Untrained networks for compressive lensless photography,” pre-print, 2021 [pdf]
2. **Kristina Monakhova***, Kyrollos Yanny*, Neerja Aggarwal, Laura Waller, “Spectral DiffuserCam: lensless snapshot hyperspectral imaging with a spectral filter array,” *Optica*, 7 (10), pp. 1298–1307, 2020 [pdf]
3. Kyrollos Yanny*, Nick Antipa*, William Liberti, Sam Dehaeck, **Kristina Monakhova**, Fanglin Lina Liu, Konlin Shen, Ren Ng, and Laura Waller, “Randoscope: Computational Single-shot Miniature 3D Fluorescence Microscope,” *Light: Science & Applications*, 9 (171), 2020 [pdf]
4. **Kristina Monakhova**, Joshua Yurtsever, Grace Kuo, Nick Antipa, Kyrollos Yanny, and Laura Waller, “Learned reconstructions for practical mask-based lensless imaging,” *Opt. Express* 27, 28075-28090 (2019) [pdf]

CONFERENCE PUBLICATIONS

1. **Kristina Monakhova***, Kyrollos Yanny*, and Laura Waller, “Snapshot hyperspectral imaging using a random phase mask and spectral filter array,” *Imaging and Applied Optics Congress*, pp. JF2F.4, Optical Society of America, 2020. [pdf]
2. Grace Kuo, **Kristina Monakhova**, Kyrollos Yanny, Ren Ng, and Laura Waller, “Spatially-varying microscope calibration from unstructured sparse inputs,” *Imaging and Applied Optics Congress*, pp. CF4C.4, Optical Society of America, 2020. [pdf]
3. Ellin Zhao, Nicolas Deshler, **Kristina Monakhova**, Laura Waller, “Multi-sensor lensless imaging: synthetic large-format sensing with a disjoint sensor array,” *Imaging and Applied Optics Congress*, pp. CF2C.6, Optical Society of America, 2020. [pdf]
4. Kyrollos Yanny, Nick Antipa, William Liberti, Sam Dehaeck, **Kristina Monakhova**, Fanglin Lina Liu, Konlin Shen, Ren Ng, and Laura Waller, “Compressed Sensing Mask-based Miniature 3D Fluorescence Microscopy” *Imaging and Applied Optics Congress*, pp. CW4B.5, Optical Society of America, 2020. [pdf]
5. **Kristina Monakhova**, Nick Antipa, and Laura Waller, “Learning for lensless mask-based imaging,” in *Computational Optical Sensing and Imaging*, pp. CTu3A–2, Optical Society of America, 2019 [pdf]

WORKSHOPS AND POSTERS

1. **Kristina Monakhova***, Kyrollos Yanny*, Neerja Aggarwal, Laura Waller, “Spectral DiffuserCam: lensless snapshot hyperspectral imaging with a spectral filter array,” in *CVPR Computational Cameras and Displays (CCD) Workshop*, June 2020 (spotlight talk)
2. Grace Kuo, Fanglin (Linda) Liu, **Kristina Monakhova**, Kyrollos Yanny, Ren Ng, Laura Waller, “On-chip fluorescence microscopy with a random microlens diffuser,” in *2020 ICCP Conference*, St. Louis, MO, Apr. 2020 (poster)
3. **Kristina Monakhova**, Joshua Yurtsever, Grace Kuo, Nick Antipa, Kyrollos Yanny, Laura Waller, “Unrolled, model-based networks for lensless imaging,” *2019 NeurIPS Deep Inverse Workshop* (poster)
4. **Kristina Monakhova**, Nick Antipa, Laura Waller, “Learning reconstructions for lensless imaging,” in *2019 Physics in ML Workshop*, Berkeley, CA, May. 2019 (poster)
5. **Kristina Monakhova**, Kyrollos Yanny, Fanglin Linda Liu, Evan Shelhamer, Emrah Bostan, Laura Waller, “Deep Diffusers - machine learning for lensless imaging,” in *2018 ICCP Conference*, Pittsburgh, PA, May. 2018 (poster)
6. Regina Eckert, **Kristina Monakhova**, Zachary F. Philips, Yongbing Zhang, Lei Tian, Laura Waller, “Advances in 3D Fourier Ptychography,” in *2017 ICCP Conference*, Stanford, CA, May. 2017 (poster)

Talks

Compressive snapshot hyperspectral Imaging using a diffuser and a spectral filter array

fall 2020

Berkeley Photobears Lightning Talk Series

Practical mask-based lensless imaging reconstructions based on physics and deep learning

fall 2019

Berkeley Center for Computational Imaging Seminar Series

Advising

GRADUATE RESEARCH

Yaying Zhao (UC Berkeley master's student, now at Facebook) summer 2020

UNDERGRADUATE RESEARCH

Vi Tran (Transfer to Excellence REU) summer/fall 2020

Trisha Sanghal (currently at UC Berkeley) 2019-2020

Jonathan Fung (currently at UC Berkeley) fall 2019

Kristie Diep (currently at UC Berkeley, BioESP REU) summer 2019

Ellin Zhao (now at Whisper AI) 2018- 2020

Joshua Yurtsever (now at Google) 2018-2020

Nico Deshler (currently at UC Berkeley, SUPERB REU) 2018-2020

Service & Mentoring

Berkeley Artificial Intelligence Research Mentoring (BAIR) Program 2018-present

Mentored undergraduate students interested in research and AI

UC Berkeley EECS Peer Mentor 2019-present

Hold regular office hours to discuss issues and support junior PhD students

WICSE 1st year mentoring program 2017-present

Serve as a mentor for 1st year female-identifying PhD students in the EECS Department

UC Berkeley Transfer-to-Excellence (TTE) REU summer 2020

Mentoring an undergraduate researcher throughout summer REU program targeted at community college students coming from low-income backgrounds or underserved communities.

EE Visit Days Coordinator spring 2020

Organized the first Virtual Visit Days for admitted EECS PhD students. Organized peer advising program, matching all admitted students with a current graduate student mentor. Coordinated with underrepresented minority groups (WICSE, QICSE, BGESS, LAGSESS) to hold virtual panels and discussions for admits. Coordinated student volunteers to promote casual admit-student interaction in a virtual setting, including virtual tours and hangouts.

UC Berkeley EECS PhD Admissions Committee winter 2020

Reviewed PhD applications for the Signal Processing track in the EECS department.

UC Berkeley Bioengineering Scholars Program (BioESP) Mentor summer 2019

Mentored bioengineering undergraduate researcher throughout summer research program.

UC Berkeley SUPERB REU Mentor summer 2018

Mentored undergraduate researcher during summer REU on a project involving thin, 3D cameras in array geometries. Student was selected to represent UC Berkeley at 2018 REU Symposium.

Electrical Engineering Graduate Student Association 2017-2018

Served as social chair, worked to create inclusive and friendly environment for graduate students.

Women in Computer Science and Electrical Engineering (WICSE) 2017-2018

Organized events to promote diversity and inclusivity within the EECS PhD program, including visit day events for female-identifying students, and mentorship program for 1st year PhD students

Professional Activities

PROFESSIONAL HONORS

Selected Participant, Rising Stars in EECS	2020
Selected Participant, NextProf Nexus Workshop	2020
EECS Departmental Scholarship to attend Grace Hopper Celebration	2020
Selected Participant, Future Digileaders, KTH Royal Institute of Technology	2019

PAPER REVIEWING

IEEE Transactions on Pattern Analysis and Machine Intelligence	2020-present
IEEE Transactions of Computational Imaging	2018 - present
Optical Society of America (OSA) - Continuum, Optics Letters	2019-present