

Elena Sizikova

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EDUCATION

Princeton University 2013-2019
PhD, Computer Science Princeton, NJ

- **Advisor:** Thomas Funkhouser
- National Science Foundation (NSF) Graduate Research Fellow

University of Oxford 2010-2013
BA, Mathematics and Computer Science Oxford, UK

WORK EXPERIENCE

New York University September 2019 - Present
Moore Sloan Faculty Fellow, Center for Data Science (CDS) New York, NY

New York University September 2019 - Present
Postdoctoral Associate, Denis Pelli Lab, Department of Psychology New York, NY

Siemens Healthcare June 2015 - April 2016, June 2017 - November 2017
Research Intern, Vision Technologies and Solutions (VTS) Group Princeton, NJ

Adobe Research June 2016 - September 2016
Research Intern, Creative Technologies Lab (CTL) Seattle, WA

Heidelberg Institute for Theoretical Studies (HITS) June 2013 - October 2013
Intern Software Developer Heidelberg, Germany

Art of Problem Solving Inc. August 2011 - August 2019
Instructor Contractor Remote

Codecademy Fall 2014
Teaching Assistant Contractor Princeton, NJ and New York, NY

UCLA IPAM Research in Industrial Projects for Students Program (RIPS) June 2012 - August 2012
Team Project Manager Los Angeles, CA

Hein Lab, Oxford University August 2011 - September 2012
Computational Biology Summer School Participant and Research Assistant Oxford, UK

PUBLICATIONS

- H. V. Vo*, **E. Sizikova**, P. Perez, J. Ponce: Large-Scale Unsupervised Object Discovery. Conference on Neural Information Processing Systems (**NeurIPS**) 2021.
- A. Lewis*, E. Mahmoodi*, Y. Zhou*, M. Coffee, **E. Sizikova**: Improving Tuberculosis (TB) Prediction using Synthetically Generated Computed Tomography (CT) Images. International Conference on Computer Vision Workshop on Computer Vision for Automated Medical Diagnosis (**ICCV CVAMD**) 2021.
- J. Haddock, L. Kassab*, S. Li, A. Kryshchenko, R. Grotheer, **E. Sizikova**, C. Wang, T. Merkh, R. W. M. A. Madushani, M. Ahn, D. Needell, K. Leonard. Semi-supervised Nonnegative Matrix Factorization for Document Classification. **Asilomar** Conference on Signals, Systems and Computers. 2021.

- T. Chu*, X. Li*, H. V. Vo*, R. M. Summers, **E. Sizikova**: Improving Weakly Supervised Lesion Segmentation using Multi-Task Learning. Medical Imaging with Deep Learning (**MIDL**) Conference 2021. *-contributed equally.
- F. Wei*, **E. Sizikova**, A. Sud, T. Funkhouser, S. Rusinkiewicz: Learning to Infer Semantic Parameters for 3D Shape Editing. International Conference on 3D Vision (**3DV**) 2020.
- M. Ahn, N. Eikmeier, J. Haddock, L. Kassab*, A. Kryshchenko, K. Leonard, D. Needell, R. W. M. A. Madushani, **E. Sizikova**, C. Wang: On Large-Scale Dynamic Topic Modeling with Nonnegative CP Tensor Decomposition. Women in Data Science and Mathematics (**WiSDM**) Workshop Proceedings, "Advances in Data Science", AWM-Springer series, 2020.
- **E. Balashova**, J. Wang, V. Singh, B. Georgescu, B. Teixeira*, A. Kapoor: 3D Organ Shape Reconstruction from Topogram Images. International Conference on Information Processing in Medical Imaging (**IPMI**) 2019.
- **E. Sizikova**: Shape Synthesis Using Structure-Aware Reasoning. PhD Thesis, **Princeton University**, 2019.
- I. Demir, C. Hahn, K. Leonard, G. Morin, D. Rahbani, A. Panotopoulou, A. Fondevilla, **E Balashova**, B. Durix, A. Kortylewski: Conference on Computer Vision and Pattern Recognition Dataset and Challenge on Deep Learning for Geometric Shape Understanding Workshop (**CVPR SkelNetOn**) 2019.
- I. Amerini, **E. Balashova**, S. Ebrahimi, K. Leonard, A. Nagrani, A. Salvador: Conference on Computer Vision and Pattern Recognition Women In Computer Vision Workshop (**CVPR WiCV**) 2019.
- **E. Balashova**, A. Bermano, V. Kim, S. DiVerdi, A. Hertzmann, T. Funkhouser: Learning a Stroke-Based Representation for Fonts. Computer Graphics Forum (**CGF**) 2018. Presented at **EUROGRAPHICS** 2019.
- **E. Balashova**, V. Singh, B. Teixeira*, J. Wang, T. Chen, T. Funkhouser: Structure-Aware Shape Synthesis. International Conference on 3D Vision (**3DV**) 2018.
- B. Teixeira*, V. Singh, K. Ma, B. Tamersoy, T. Chen, Y. Wu, **E. Balashova**, D. Comaniciu: Generating Synthetic X-ray Images of a Person from the Surface Geometry. Conference on Computer Vision and Pattern Recognition (**CVPR**) 2018. **Spotlight Presentation**.
- **E. Sizikova**, T. Funkhouser: Fresco Reconstruction Using a Genetic Algorithm. ACM Journal on Computing and Cultural Heritage (**JOCCH**) 2018.
- A. Stank, D.B. Kokh, M. Horn, **E. Sizikova**, R. Neil, J. Panecka, S. Richter, R.C. Wade: TRAPP webserver: predicting protein binding site flexibility and detecting transient binding pockets. **Journal of Nucleic Acids Research** 2017.
- **E. Sizikova**, V. K. Singh, B. Georgescu, M. Halber, K. Ma, T. Chen: Enhancing Place Recognition using Joint Intensity - Depth Analysis and Synthetic Data. European Conference on Computer Vision Workshop on Virtual/Augmented Reality for Visual Artificial Intelligence (**ECCV VARVAI**) 2016. **Best Paper Award**.
- **E. Sizikova**, T. Funkhouser: Fresco Reconstruction Using a Genetic Algorithm. Workshop on Graphics and Cultural Heritage (**EUROGRAPHICS GCH**) 2016. **Best Paper Award**.
- O. Fried*, S. Di Verdi, M. Halber, **E. Sizikova**, A. Finkelstein: IsoMatch: Creating Informative Grid Layouts. **EUROGRAPHICS** 2015.
- R. Lyngsø, J. Anderson, **E. Sizikova**, A. Badugu, T. Hyland and J. Hein. Frnakenstein: Multiple target inverse RNA folding. **BMC Bioinformatics** 2012. **High access factor noted by BMC Bioinformatics**.

PREPRINTS AND MANUSCRIPTS IN PROGRESS

- **E. Sizikova**, J. Vendrow*, R. Grotheer, J. Haddock, L. Kassab*, A. Kryshchenko, T. Merkh*, M. Rajapaksha, H. V. Vo*, C. Wang, K. Leonard, D. Needell: NMFx: Analyzing Network Features using Non-Negative Matrix Factorization. 2021.
- Y. Chen*, Y. Marchetti, **E. Sizikova**, Y. R. Gel: TCN: Pioneering Topological-based Convolutional Networks for Planetary Terrain Learning. 2021.
- A. Subramanian*, O. Kumbhar*, **E. Sizikova**, N.J. Majaj, D. G. Pelli: SATBench: A Benchmark of the Human Speed-Accuracy Tradeoff in Recognizing Objects. 2021.
- S. Siddiqui*, **E. Sizikova**, G. Roig, N. J. Majaj, D. G. Pelli: Using Human Psychophysics to Evaluate Generalization in Scene Text Recognition Models. arXiv:2007.00083. 2020.
- O. Kumbhar*, **E. Sizikova**, N.J. Majaj, D. G. Pelli: Anytime Prediction as a Model of Human Reaction Time. arXiv:2011.12859. 2020.

CONFERENCE ABSTRACTS

- **E. Sizikova**, C. Long* , O. Kumbhar*, N. Majaj, D. G. Pelli: Word Recognition in Humans and Deep Neural Networks. Cold Spring Harbor Lab (CSHL) 2020 From Neuroscience to Artificially Intelligent Systems Virtual Conference (**NAISys**) 2020.
- **E. Sizikova**, C. Long* , O. Kumbhar*, N. Majaj, D. G. Pelli: Comparing Word Recognition by Humans and Deep Neural Networks. Vision Sciences Society Meeting (**VSS**) 2020.
- **E. Sizikova**, T. Funkhouser: Automatically Assembling Frescos from Noisy Pairwise Fragment Measurements. Computer Applications and Quantitative Methods in Archaeology (**CAA**) 2015. **Oral Presentation**.
- C. Quaranta**, I. A. Ibarra**, E. Schwartz**, **E. Sizikova****: Improving Cross - lingual Search Quality. Joint Mathematical Meetings (**JMM**) 2013. Invited Talk. *-contributed equally.

* - denotes student author.

TEACHING

DSGA 1006: Capstone Project and Presentation <i>NYU Center for Data Science (CDS)</i>	Fall 2021 Instructor
DSGA 3001: Special Topics in Data Science: Introduction to Computer Vision <i>NYU Center for Data Science (CDS), Computer Science</i>	Spring 2021 Instructor
DSGA 1006: Capstone Project and Presentation <i>NYU Center for Data Science (CDS)</i>	Fall 2020 Instructor
DSGA 1006: Capstone Project and Presentation <i>NYU Center for Data Science (CDS)</i>	Fall 2019 Instructor
COS 424: Fundamentals of Machine Learning <i>Princeton University Department of Computer Science</i>	Spring 2016 Teaching Assistant
COS 226: Data Structures and Algorithms <i>Princeton University Department of Computer Science</i>	Fall 2015 Teaching Assistant

AWARDS AND HONORS

Rising Star in Engineering in Health

December 2020

School of Engineering and College of Physicians and Surgeons at Columbia University

Moore Sloan Fellowship

2019 - 2021

Research support for independent postdoctoral research at the NYU Center for Data Science (CDS)

Best Paper Award

October 2016

ECCV Workshop on Virtual/Augmented Reality for Visual Artificial Intelligence (VARVAI)

- Sponsored by Xerox Research Europe and Facebook AI Research
- Awarded for the “Enhancing Place Recognition using Joint Intensity - Depth Analysis and Synthetic Data” project

Best Paper Award

October 2016

EUROGRAPHICS Workshop on Graphics and Cultural Heritage (GCH)

- Awarded for the “Fresco Reconstruction Using a Genetic Algorithm” project

NSF Graduate Fellowship (GRFP)

June 2014 - June 2018

Support of graduate research and tuition

University of Oxford, St. Annes College Exhibition

October 2011, October 2012

Awarded for excellent performance in Moderations and Part A exams

Association of Women in Mathematics (AWM) Essay Contest

April 2009

Honorable Mention

1st Place in the International Caucus for Women in Statistics Poster Competition

February 2009

Awarded for poster titled “Potential Risk Factors for Drug Addiction”

USA Mathematical Talent Search (USAMTS) Silver and Bronze Medalist

September 2007 - May 2009

USAMTS is a prestigious nationwide competition in mathematics

SELECT INVITED TALKS

November 2021: Using Partially Supervised Learning for Image Processing Applications to Medical Imaging, Capital One

March 2021: Improving Weakly Supervised Lesion Segmentation using Multi-Task Learning, National Institutes of Health (NIH)

October 2020: Weakly Supervised Localization for COVID-19 Analysis, NYU COVID-19 Research Meeting

October 2020: Comparing Word Recognition by Humans and Deep Neural Networks and Application of Understanding Dyslexia, Academic Data Science Alliance (ADSA) Annual Meeting

July 2020: Comparing Humans and Neural Networks with Applications to Studying Dyslexia, Summer Incubator Lunch and Learn (NYU Center for Data Science)

April 2020: Shape Synthesis Using Structure-Aware Reasoning and Medical Applications, California State University, Channel Islands (CSU-CI)

November 2019: Structure-Aware Reasoning and Learning, Samsung Research NY

October 2019: Shape Synthesis Using Structure-Aware Reasoning and Medical Applications (NYU Data Science)

June 2019: Structure-Aware Shape Analysis in Medical Imaging, NYU School of Medicine, Radiology Seminar

July 2018: Structure-Aware Shape Synthesis, Max Planck Institute for Intelligent Systems (MPI)

GRANTS AND FUNDING

NYU Center For Data Science/Data Science and Software Services (DS3)/Moore Sloan Foundation	May 2020
<i>Funding for project titled "Interpretable Tensor Factorization Methods for COVID-19 Progression Analysis"</i>	\$5,000
NSF Graduate Fellowship	June 2014 - June 2018
<i>Support of graduate research and tuition</i>	\$132,000

TRAVEL AND CONFERENCE SCHOLARSHIPS

NYU Center for Data Science	September 2021
<i>Support grant to attend the Grace Hopper Conference</i>	Virtual
NYU Center for Data Science	September 2020
<i>Support grant to attend the Grace Hopper Conference</i>	Virtual
Elsevier/Vision Research Travel Award	May 2020
<i>Support grant to attend and present a poster at the Vision Science Society (VSS) Meeting</i>	Virtual
Moore Sloan Data Science (MSDS) Summit	November 2019
<i>Travel grant to attend and present a poster at the annual MSDS summit</i>	Santa Fe, NM
Women in Data Science and Mathematics (WiSDM) 2019 Travel Grant	July 2019
<i>Travel grant to attend the WiSDM workshop at Brown University</i>	Providence, RI
Association for Women in Mathematics (AWM) Workshop SIAM Travel Grant	July 2018
<i>Travel grant to the attend and present at the AWM Workshop at the 2018 SIAM Annual Meeting</i>	Portland, OR
French-American Doctoral Exchange Program (FADEx)	July 2018
<i>Travel grant to attend the FADEx doctoral exchange program</i>	Sophia Antipolis, Grenoble, and Paris, France
CRA-W/Princeton Travel Grant	April 2016
<i>Travel grant to attend the CRA-W Grad Cohort Workshop</i>	San Diego, CA
Princeton University School of Eng. and Appl. Science (SEAS) Fellowship	October 2015
<i>Travel grant to attend the Grace Hopper Conference</i>	Houston, TX
Princeton University School of Eng. and Appl. Science (SEAS) Fellowship	October 2014
<i>Travel grant to attend the Grace Hopper Conference</i>	Phoenix, AZ
Princeton University Center for Digital Humanities (CDH) Fellowship	December 2014
<i>Support to attend the Computer Applications & Quantitative Methods in Archaeology (CAA) Conference</i>	Siena, Italy
Mathematical Association of America (MAA) Travel Grant	November 2012
<i>Support travel and present at Joint Mathematics Meetings (JMM)</i>	San Diego, CA
Women in Machine Learning (WIML) Travel Scholarship	October 2012
<i>Awarded to support travel to the 2012 WIML/NIPS Conference</i>	Lake Tahoe, NV

SERVICE AND MENTORING ACTIVITIES

Machine Learning for Health (ML4H) 2021 Conference	Summer 2021, Fall 2021
<i>Website coordinator sub-chair, Reviewer Mentor</i>	
NYU Center for Data Science (CDS) Diversity and Inclusion Committee	Fall 2020
<i>Faculty Fellow Representative</i>	

NYU Center for Data Science (CDS) Summer Incubator Internship Program <i>Mentor</i>	Summer 2020
CVPR Women in Computer Vision (WICV) Workshop <i>Mentor</i>	June 2020
Try AI, Diversity and Inclusion Event at AAAI 2020 <i>Mentor</i>	February 2020
CVPR Deep Learning for Geometric Shape Understanding SkelNetOn Workshop <i>Program Committee/Point SkelNetOn Keeper</i>	November 2018 - June 2019
CVPR Women in Computer Vision Workshop (WiCV) 2019 <i>Organizer</i>	October 2018 - June 2019
Princeton Graduate Women in Science and Engineering (GWISE) - NYU High School Conference <i>Mentor</i>	November 2018
AI-4ALL Summer camp <i>Part-time mentor for the self-driving cars team</i>	August 2018
Princeton University Math Club Mentoring Mobius <i>Mentor to 4 undergraduate students</i>	October 2016 - December 2016
Coalition for Queens (C4Q) <i>Teaching Assistant for Access Code Program HTML/CSS Workshop</i>	February 2015
University of Oxford, Math Undergraduate Representative Committee (MURC) <i>Math and CS Representative</i>	October 2010 - June 2013
University of Oxford, Oxford Salsa Society <i>Webmaster</i>	October 2010 - June 2013

PAPER REVIEWING

Winter Conference on Applications of Computer Vision (WACV): 2022
 Neural Information Processing Systems (NeurIPS): 2020, 2021
 Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks Track: 2021
 International Conference on Computer Vision (ICCV): 2021
 International Conference on Computer Vision (ICCV) Workshop on Deep Learning for Geometric Computing (DLGC): 2021
 Computer Vision and Pattern Recognition (CVPR): 2021
 Journal of Vision: 2021 (Exceptional JOV Review Writer)
 Multidisciplinary Digital Publishing Institute (MDPI): 2021
 Cognitive Science Society Conference (CogSci): 2021
 Heritage: 2020
 Journal on Computing and Cultural Heritage (JOCCH): 2020
 Computer Vision and Pattern Recognition (CVPR) Workshop on Deep Learning for Geometric Computing (DLGC): 2020
 Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH): 2020
 British Machine Learning Conference (BMVC): 2019
 Pacific Graphics (PG): 2018
 International Journal of Computer Vision (IJCV): 2017
 Journal of Computers & Graphics (JCG): 2016
 Shape Modeling International (SMI): 2014

STUDENT PROJECTS SUPERVISED

- Evanjelin Mahmoodi (University of California, Santa Cruz), Ashia Lewis (University of Alabama), Undergraduate Level, via NYU CURP Internship, Spring 2021, Yuyue Zhou (Independent Study, Masters Level), Spring 2021, NYU. Project: "Improving Tuberculosis (TB) Prediction Using Synthetically Generated Computed Tomography (CT) Images", joint with Prof. Megan Coffee. Published at ICCV CVAMD 2021 Workshop.
- Isaac Lopez (University of Puerto Rico at Mayaguez) and Sheikh-Sedat Touray (University of Rhode Island), Undergraduate Level, via NYU CURP Internship, Spring 2021. Project: "Self-Supervised Learning for Animal Pose Prediction", joint with Prof. Carlos Fernandez-Granda and Talmo Pereira.
- Tianshu Chu and Xinmeng Li (NYU, Masters Level). Summer Incubator Internship. Summer 2020, Fall 2020, NYU. Project: "Improving Weakly Supervised Lesion Segmentation Using Multi-Task Learning". Published at MIDL 2021 Conference.
- Kuan-Lin Liu (Independent Study, Masters Level), Summer 2020, NYU. Project: "A Computational Model of Dyslexia", joint with Prof. Denis Pelli and Prof. Najib Majaj.
- Zane Dennis (Summer COVID-19/X-ray Internship, Masters Level), Summer 2020, NYU. Project: "Interpretable Tensor Factorization Methods for COVID-19 Progression Analysis".
- Sahar Siddiqui (Independent Study, Masters Level), Spring 2020, NYU. Project: "Using Human Psychophysics to Evaluate Generalization in Scene Text Recognition Models", joint with Prof. Denis Pelli, Prof. Gemma Roig, and Prof. Najib Majaj.
- Diksha Meghwal (Independent Study, Masters Level), Spring 2020, NYU. Project: "Structure Aware Image Reconstruction".
- Jatin Khilnani (CDS Inference and Representation (Masters) Course), Fall 2019, NYU. Project: "Shape-Synthesis Analysis".
- Shuting Gu, Anshan He, Weiyang Wen, Bing Zou (CDS Capstone Project Masters) Course, Fall 2019, NYU). Project: "Exploiting Google Street View to Generate Global-scale Datasets for Training Next Generation Cyberphysical Systems". Joint with Dr. Anastasios Noulas.