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 2017 - November 2017
Research Intern, Vision Technologies and Solutions (VTS) Princeton, NJ

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

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

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

Codeacademy 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

- Y. Chen, Y. Marchetti, **E. Sizikova**, Y. R. Gel: TCN: Pioneering Topological-based Convolutional Networks for Planetary Terrain Learning. Annual Conference on Innovative Applications of Artificial Intelligence (**IAAI**) 2022.
- 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

- X. Cao*, T. Kun, T. Zhou, E. Li, A. Liu, C. Liu, S. Mei, **E. Sizikova**, C. Zheng: Traffic Scenes Representation Learning via Masked Self-Supervision. 2022.
- **E. Sizikova**, X. Cao*, A. Lewis*, K. Moise, M. Coffee: Improving Computed Tomography (CT) Reconstruction via 3D Shape Induction. 2022.
- **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.
- 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

- A. Subramanian*, **E. Sizikova**, O. Kumbhar*, N. Majaj., D. G. Pelli: Benchmarking Dynamic Neural-Network Models of the Human Speed-Accuracy Tradeoff. Vision Sciences Society Meeting (**VSS**) 2022.
- **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 3001: Special Topics in Data Science: Introduction to Computer Vision Spring 2021, Spring 2022
NYU Center for Data Science (CDS), Computer Science Instructor

DSGA 1006: Capstone Project and Presentation Fall 2019, Fall 2020, Fall 2021
NYU Center for Data Science (CDS) Instructor

COS 424: Fundamentals of Machine Learning Spring 2016
Princeton University Department of Computer Science Teaching Assistant

COS 226: Data Structures and Algorithms Fall 2015
Princeton University Department of Computer Science 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
Funding for project titled "Interpretable Tensor Factorization Methods for COVID-19 Progression Analysis" $5,000

NSF Graduate Fellowship June 2014 - June 2018
Support of graduate research and tuition $132,000

TRAVEL AND CONFERENCE SCHOLARSHIPS

NYU Center for Data Science September 2021
Support grant to attend the Grace Hopper Conference Virtual

NYU Center for Data Science September 2020
Support grant to attend the Grace Hopper Conference Virtual

Elsevier/Vision Research Travel Award May 2020
Support grant to attend and present a poster at the Vision Science Society (VSS) Meeting Virtual

Moore Sloan Data Science (MSDS) Summit November 2019
Travel grant to attend and present a poster at the annual MSDS summit Santa Fe, NM

Women in Data Science and Mathematics (WiSDM) 2019 Travel Grant July 2019
Travel grant to attend the WiSDM workshop at Brown University Providence, RI

Association for Women in Mathematics (AWM) Workshop SIAM Travel Grant July 2018
Travel grant to the attend and present at the AWM Workshop at the 2018 SIAM Annual Meeting Portland, OR

French-American Doctoral Exchange Program (FADEx) July 2018
Travel grant to attend the FADEx doctoral exchange program Sophia Antipolis, Grenoble, and Paris, France

CRA-W/Princeton Travel Grant April 2016
Travel grant to attend the CRA-W Grad Cohort Workshop San Diego, CA

Princeton University School of Eng. and Appl. Science (SEAS) Fellowship October 2015
Travel grant to attend the Grace Hopper Conference Houston, TX

Princeton University School of Eng. and Appl. Science (SEAS) Fellowship October 2014
Travel grant to attend the Grace Hopper Conference Phoenix, AZ

Princeton University Center for Digital Humanities (CDH) Fellowship December 2014
Support to attend the Computer Applications & Quantitative Methods in Archaeology (CAA) Conference Siena, Italy

Mathematical Association of America (MAA) Travel Grant November 2012
Support travel and present at Joint Mathematics Meetings (JMM) San Diego, CA

Women in Machine Learning (WIML) Travel Scholarship October 2012
Awarded to support travel to the 2012 WIML/NIPS Conference Lake Tahoe, NV

SERVICE AND MENTORING ACTIVITIES

IEEE International Conference on Computer Vision (ICCV) 2023 October 2021 - October 2023
Web Chair

Machine Learning for Health (ML4H) 2021 Conference Summer 2021, Fall 2021
Website Coordinator Chair, Reviewer Mentor

NYU Center for Data Science (CDS) Diversity and Inclusion Committee Fall 2020
Faculty Fellow Representative

NYU Center for Data Science (CDS) Summer Incubator Internship Program Summer 2020
Mentor

CVPR Women in Computer Vision (WICV) Workshop June 2020
Mentor

Try AI, Diversity and Inclusion Event at AAAI 2020 February 2020
Mentor

CVPR Deep Learning for Geometric Shape Understanding SkelNetOn Workshop November 2018 - June 2019
Program Committee/Point SkelNetOn Keeper

CVPR Women in Computer Vision Workshop (WiCV) 2019 October 2018 - June 2019
Organizer

Princeton Graduate Women in Science and Engineering (GWISE) - NYU High School Conference November 2018
Mentor

AI-4ALL Summer camp August 2018
Part-time mentor for the self-driving cars team

Princeton University Math Club Mentoring Mobius October 2016 - December 2016
Mentor to 4 undergraduate students

Coalition for Queens (C4Q) February 2015
Teaching Assistant for Access Code Program HTML/CSS Workshop

University of Oxford, Math Undergraduate Representative Committee (MURC) October 2010 - June 2013
Math and CS Representative

University of Oxford, Oxford Salsa Society October 2010 - June 2013
Webmaster

PAPER REVIEWING

European Conference on Computer Vision (ECCV): 2022
International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI): 2022
International Conference on Learning Representations (ICLR): 2022
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, 2022
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 (IET): 2017
Journal of Computers & Graphics (CAG): 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.