

Elena Sizikova

Moore Sloan Faculty Fellow/Assistant Professor, Center for Data Science, New York University (NYU)

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Date Prepared: September 29, 2021

Education

Princeton University, Department of Computer Science

PhD Student and National Science Foundation (NSF) Fellow advised by Prof. Thomas Funkhouser

Princeton, NJ

2013 - 2019

University of Oxford

BA Mathematics and Computer Science

Oxford, UK

2010 - 2013

Work Experience

New York University

Moore Sloan Faculty Fellow/Assistant Professor

New York, NY

September 2019 - Present

New York University

Postdoctoral Associate, Denis Pelli Lab, Department of Psychology

New York, NY

September 2019 - Present

Siemens Healthcare, Vision Technologies and Solutions (VTS) Group

Research Intern

Princeton, NJ

June 2015 - April 2016, June 2017 - November 2017

Adobe Research, Creative Technologies Lab (CTL)

Research Intern

Seattle, WA

June 2016 - September 2016

Heidelberg Institute for Theoretical Studies (HITS)

Intern Software Developer

Heidelberg, Germany

June 2013 - October 2013

Art of Problem Solving Inc.

Instructor Contractor

Remote

August 2011 - August 2019

Codecademy

Teaching Assistant Contractor

Princeton, NJ and New York, NY

Fall 2014

UCLA IPAM Research in Industrial Projects for Students Program (RIPS)

Team Project Manager

Los Angeles, CA

June 2012 - August 2012

Hein Lab, Oxford University

Computational Biology Summer School Participant and Research Assistant

Oxford, UK

August 2011 - September 2012

Publications

- H. V. Vo*, E. Sizikova, P. Perez, J. Ponce: Large-Scale Unsupervised Object Discovery. Conference on Neural Information Processing Systems (NeurIPS) Conference 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 (ICCV) Workshop on Computer Vision for Automated Medical Diagnosis (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. * - equal contribution.

- 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: SkelNetOn 2019 Dataset and Challenge on Deep Learning for Geometric Shape Understanding. Conference on Computer Vision and Pattern Recognition (CVPR) 2019 Workshops.
- I. Amerini, **E. Balashova**, S. Ebrahimi, K. Leonard, A. Nagrani, A. Salvador: WiCV 2019: The Sixth Women In Computer Vision Workshop. Conference on Computer Vision and Pattern Recognition (CVPR) 2019 Workshops.
- **E. Balashova**, A. Bermano, V. Kim, S. DiVerdi, A. Hertzmann, T. Funkhouser: Learning a Stroke-Based Representation for Fonts. Computer Graphics Forum (CGF) 2018.
- **E. Balashova**, V. Singh, B. Teixeira*, J. Wang, T. Chen, T. Funkhouser: Structure-Aware Shape Synthesis. International Conference on 3D Vision (3DV) 2018. **Spotlight Presentation.**
- 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 (ECCV) Workshop on Virtual/Augmented Reality for Visual Artificial Intelligence (VARVAI), 2016. **Best Paper Award.**
- **E. Sizikova**, T. Funkhouser: Fresco Reconstruction Using a Genetic Algorithm. EUROGRAPHICS Workshop on Graphics and Cultural Heritage (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 (NAISys) Virtual Conference 2020.
- E. Sizikova, C. Long* , O. Kumbhar*, N. Majaj, D. G. Pelli: Comparing Word Recognition by Humans and Deep Neural Networks. Vision Sciences Society (VSS) Meeting 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. (* denotes equal contribution.)

* - denotes student author.

Teaching

Instructor for Capstone Project and Presentation Course

NYU Center for Data Science (CDS)

Fall 2021

Instructor for Introduction to Computer Vision

NYU Department of Computer Science, with Prof. Jean Ponce

Spring 2021

Instructor for Capstone Project and Presentation Course

NYU Center for Data Science (CDS)

Fall 2020

Instructor for Capstone Project and Presentation Course

NYU Center for Data Science (CDS)

Fall 2019

Teaching Assistant for COS424: Fundamentals of Machine Learning

Princeton University, Department of Computer Science

Princeton, NJ

February 2016 - June 2016

Teaching Assistant for COS226: Data Structures and Algorithms

Princeton University, Department of Computer Science

Princeton, NJ

September 2015 - January 2016

Awards and Honors

Rising Star in Engineering in Health

Awarded by the School of Engineering and College of Physicians and Surgeons at Columbia University

December 2020

Moore Sloan Fellowship

Research support for data science research at the NYU Center for Data Science.

2019 - 2021

ECCVW Best Paper Award, sponsored by Xerox Research Europe and Facebook AI Research

Awarded for Enhancing Place Recognition Project

October 2016

EUROGRAPHICS GCH Best Paper Award

Awarded for Fresco Project

October 2016

NSF Graduate Fellowship

Support of graduate research and tuition for the period of three years

June 2014 - June 2018

St. Annes College Exhibition

Awarded for excellent performance in Moderations and Part A exams

October 2011, October 2012

Association of Women in Mathematics (AWM) Essay Contest

Honorable Mention

April 2009

1st Place in Intl. Caucus for Women in Stat. Poster Competition*Poster titled: Potential Risk Factors for Drug Addiction**February 2009***USA Mathematical Talent Search Silver and Bronze Medalist***USAMTS is a prestigious nationwide competition in mathematics**September 2007 - May 2009***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 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**May 2019:** Learning A Stroke-Based Representation for Fonts, EUROGRAPHICS 2019**July 2018:** Structure-Aware Shape Synthesis, Max Planck Institute for Intelligent Systems (MPI)**September 2018:** Structure-Aware Shape Synthesis, 3DV 2018**October 2016:** Wall Painting Reconstruction Using a Genetic Algorithm, EUROGRAPHICS Workshop on Graphics and Cultural Heritage (GCH) 2016**March 2015:** Automatically Assembling Frescos From Noisy Pairwise Fragment Measurements, Computer Applications and Quantitative Methods in Archaeology (CAA) 2015**January 2013:** Improving Cross-lingual Search Quality, Joint Mathematical Meetings (JMM) 2013**Grants and Funding****NYU Center For Data Science/DS3/Moore Sloan Foundation**

\$5,000

*Funding for project titled "Interpretable Tensor Factorization Methods for COVID-19 Progression Analysis"**May 2020***NSF Graduate Fellowship**

\$132,000

*Support of graduate research and tuition for the period of three years**June 2014 - June 2018***Travel Scholarships and Grants****NYU Center for Data Science Grace Hopper Support***Support to attend the Virtual Grace Hopper Conference**September 2020***Elsevier/Vision Research Travel Award***Travel grant to present a poster at the Vision Science Society (VSS) Meeting**May 2020***Moore Sloan Data Science (MSDS) Summit***Travel grant to attend and present a poster at the annual summit in Santa Fe, NM**November 2019***Women in Data Science and Mathematics (WiSDM) 2019 Travel Grant***Travel grant to attend the workshop in Brown University, Providence Rhode Island**July 2019***AWM SIAM Travel Grant***Support to attend AWM Workshop at the 2018 SIAM Annual Meeting and present a poster**July 2018***French-American Doctoral Exchange Program (FADEx) Scholarship***Support to attend an AI doctoral exchange program in Sophia-Antipolis, Grenoble, and Paris, France**June 2018***CRA-W/Princeton Travel Grant***Support to attend the CRA-W Grad Cohort Workshop**April 2016*

School of Eng. and Appl. Science (SEAS) Fellowship*Support to attend the Grace Hopper Conference in Phoenix, AZ**October 2014, October 2015***Center for Digital Humanities (CDH) Fellowship***Support to Computer Appl. in Archaeology (CAA) Conference in Siena, Italy**December 2014***MAA Undergraduate Student Poster Session Travel Grant***Awarded to support travel to JMM in San Diego, California**November 2012***Women in Machine Learning (WIML) Travel Scholarship***Awarded to support travel to the 2012 WIML at Lake Tahoe, NV**October 2012***Service and Mentoring Activities****Machine Learning for Health (ML4H) 2021 Conference***Website coordinator sub-chair, Reviewer Mentor**Summer 2021, Fall 2021***NYU Center for Data Science (CDS) Diversity and Inclusion Committee***Faculty Fellow Rep.**Fall 2020***NYU Center for Data Science (CDS) Summer Incubator Internship Program***Mentor**Summer 2020***CVPR Women in Computer Vision (WICV) Workshop***Mentor**June 2020***Try AI, Diversity and Inclusion Event at AAAI 2020***Mentor**February 2020***Deep Learning for Geometric Shape Understanding (SkelNetOn)***Program Committee/Point SkelNetOn Keeper**November 2018 - June 2019***Women in Computer Vision Workshop (WiCV) for CVPR 2019***Organizer**October 2018 - June 2019***Graduate Women in Science and Engineering (GWISE) - NYU High School Conference***Mentor**November 2018***AI-4ALL Summer camp***Part-time mentor for the self-driving cars team.**Princeton, NJ**August 2018***Princeton University Math Club Mentoring Mobius***Mentor to 4 undergraduate students**Princeton, NJ**October 2016 - December 2016***Coalition for Queens (C4Q)***Teaching Assistant for Access Code Program HTML/CSS Workshop**Brooklyn, NY**February 2015***University of Oxford***Math and CS Representative, Math Undergraduate Representative Committee (MURC)**Oxford, UK**October 2010 - June 2013***University of Oxford***Oxford Salsa Society Webmaster**Oxford, UK**October 2010 - May 2013***Paper Reviewing**

- Winter Conference on Applications of Computer Vision (WACV), 2022
- Neural Information Processing Systems (NeurIPS), 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
- Neural Information Processing Systems (NeurIPS), 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 (CAG), 2016
- Shape Modelling International (SMI), 2014

Students Supervised

- Isaac Lopez (University of Puerto Rico at Mayaguez) and Sheikh-Sadat 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.
- Evanjin 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.
- 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, joint with Denis Pelli. Project: “A Computational Model of Dyslexia”.
- 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”.
- 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), joint with Anastasios Noulas Project: “Exploiting Google Street View to Generate Global-scale Datasets for Training Next Generation Cyberphysical Systems”.