

## Elena Sizikova

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

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### 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

### Manuscripts and Work in Progress

- A. Subramanian\*, O. Kumbhar\*, **E. Sizikova**, N.J. Majaj, D. G. Pelli: Using Dynamic Neural Networks to Model the Speed-Accuracy Trade-Off in People. Submitted to the Neural Information Processing Systems Conference (NeurIPS), Datasets and Benchmarks Track 2021.
- H. V. Vo\*, **E. Sizikova**, P. Perez, J. Ponce: Large-Scale Unsupervised Object Discovery as Ranking. Submitted to the Neural Information Processing Systems Conference (NeurIPS) 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 NMF Models for Topic Modeling in Learning Tasks. arXiv:2010.07956. 2020.
- 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.

- **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: Weakly-Supervised Object Localization using Semi-Supervised Non-Negative Matrix Factorization. In Preparation.
- O. Kumbhar\*, **E. Sizikova**, N.J. Majaj, D. G. Pelli: Anytime Prediction as a Model of Human Reaction Time. arXiv:2011.12859. 2020.

\* - denotes student author.

## Publications

- 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.**

\* - denotes student author.

## 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 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

**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

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

## Travel Scholarships and Grants

<b>NYU Center for Data Science Grace Hopper Support</b>	
<i>Support to attend the Virtual Grace Hopper Conference</i>	September 2020
<b>Elsevier/Vision Research Travel Award</b>	
<i>Travel grant to present a poster at the Vision Science Society (VSS) Meeting</i>	May 2020
<b>Moore Sloan Data Science (MSDS) Summit</b>	
<i>Travel grant to attend and present a poster at the annual summit in Santa Fe, NM</i>	November 2019
<b>Women in Data Science and Mathematics (WiSDM) 2019 Travel Grant</b>	
<i>Travel grant to attend the workshop in Brown University, Providence Rhode Island</i>	July 2019
<b>AWM SIAM Travel Grant</b>	
<i>Support to the attend AWM Workshop at the 2018 SIAM Annual Meeting and present a poster</i>	July 2018
<b>French-American Doctoral Exchange Program (FADEx) Scholarship</b>	
<i>Support to attend an AI doctoral exchange program in Sophia-Antipolis, Grenoble, and Paris, France</i>	June 2018
<b>CRA-W/Princeton Travel Grant</b>	
<i>Support to attend the CRA-W Grad Cohort Workshop</i>	April 2016
<b>School of Eng. and Appl. Science (SEAS) Fellowship</b>	
<i>Support to attend the Grace Hopper Conference in Phoenix, AZ</i>	October 2014, October 2015
<b>Center for Digital Humanities (CDH) Fellowship</b>	
<i>Support to Computer Appl. in Archaeology (CAA) Conference in Siena, Italy</i>	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****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**

- ICCV 2021
- CVPR 2021
- Journal of Vision 2021: Exceptional JOV Review Writer
- MDPI Sensors 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-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.
- Evanjin Mahmoodi (University of California, Santa Cruz), Ashia Lewis (University of Alabama), Undergraduate Level, via NYU CURP Internship, Spring 2021, University of Puerto Rico at Mayaguez. Project: “3D CT Reconstruction from X-Ray for Automatic Tuberculosis Prediction”, joint with Prof. Megan Coffee.
- Yuyue Zhou (Independent Study, Masters Level), Spring 2021, NYU. Project: “Automatic Image Translation for X-Ray Generation”.
- 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”.
- 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”.