

# Elena Sizikova

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## EDUCATION

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**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

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**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

**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

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- 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

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- **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

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- **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

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<b>DSGA 3001: Special Topics in Data Science: Introduction to Computer Vision</b> <i>NYU Center for Data Science (CDS), Computer Science</i>	Spring 2021, Spring 2022 Instructor
<b>DSGA 1006: Capstone Project and Presentation</b> <i>NYU Center for Data Science (CDS)</i>	Fall 2019, Fall 2020, Fall 2021 Instructor
<b>COS 424: Fundamentals of Machine Learning</b> <i>Princeton University Department of Computer Science</i>	Spring 2016 Teaching Assistant
<b>COS 226: Data Structures and Algorithms</b> <i>Princeton University Department of Computer Science</i>	Fall 2015 Teaching Assistant

## AWARDS AND HONORS

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**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

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**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

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

## TRAVEL AND CONFERENCE SCHOLARSHIPS

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

## SERVICE AND MENTORING ACTIVITIES

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<b>IEEE International Conference on Computer Vision (ICCV) 2023</b>	October 2021 - October 2023
<i>Web Chair</i>	
<b>Machine Learning for Health (ML4H) 2021 Conference</b>	Summer 2021, Fall 2021
<i>Website Coordinator Chair, Reviewer Mentor</i>	

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

## **PAPER REVIEWING**

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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 (IJCV): 2017

Journal of Computers & Graphics (JCG): 2016

Shape Modeling International (SMI): 2014

## STUDENT PROJECTS SUPERVISED

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- 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.