# Elena Sizikova

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## Education

**Princeton University, Department of Computer Science** — Princeton, NJ
*PhD Student and National Science Foundation (NSF) Fellow advised by Prof. Thomas Funkhouser* — *2013 - 2019*

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

## Work Experience

**New York University** — New York, NY
*Moore Sloan Faculty Fellow/Assistant Professor* — *September 2019 - Present*

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

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

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

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

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

**Codeacademy** — Princeton, NJ and New York, NY
*Teaching Assistant Contractor* — *Fall 2014*

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

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

## Preprints

- H. V. Vo⋆, **E. Sizikova**, P. Perez, J. Ponce: Large-Scale Unsupervised Object Discovery. arXiv:2106.06650. 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.

## Publications

- 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.

## 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.

## 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, NJ
*Princeton University, Department of Computer Science* — *February 2016 - June 2016*

**Teaching Assistant for COS226: Data Structures and Algorithms** — Princeton, NJ
*Princeton University, Department of Computer Science* — *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 the 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** Princeton, NJ
*Part-time mentor for the self-driving cars team.* *August 2018*

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

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

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

**University of Oxford** Oxford, UK
*Oxford Salsa Society Webmaster* *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 (IET), 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.
- 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.
- 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 ".