

Neel Dey

Education

2017–present **Ph.D.**, Computer Science, New York University, Tandon School of Engineering.
Advisor: Prof. Guido Gerig.

2015–2017 **M.S.**, Electrical Engineering, New York University, Tandon School of Engineering.
Thesis Committee: Profs. Guido Gerig, Yao Wang, R. Theodore Smith.

2010–2014 **B.E.**, Electronics and Telecommunications, University of Mumbai.

Experience

Summer 2019 **Image Data Science Intern**, Merck Research Laboratories, Merck and Co.

2019 Developed novel deep generative adversarial models applied to cancer research, with general applications in computer vision.

2016–present **Research Assistant** (2018–) & **Ph.D. Fellow** (2017–2018) & **Graduate Assistant** (2016–17), Visualization, Imaging and Data Analysis Lab., NYU Computer Science & Engineering.

- **Microscopic Image Analysis:**
 - Multi-modal spectral image analysis for molecular identification of disease-causing substances.
 - Developed novel algorithms for robust non-negative tensor decomposition and nonlinear motion correction using diffeomorphic atlases.
 - Developed functional data analysis to perform statistical testing on curve-valued data.
- **High Angular Resolution Diffusion MRI Brain Imaging:**
 - Worked on HARDIprep for diffusion MRI quality control to restore high-resolution diffusion brain scans corrupted by patient movement.
 - Working on weakly-supervised discriminative feature learning for analyzing autistic infant brains.
- **Current Research Interests:**
 - Generative Adversarial Networks, Group Theory applied to Vision, Deformable Registration, Wasserstein Learning, Weakly-supervised 3D segmentation

Spring 2016 **Graduate Assistant**, Soil Mechanics Lab, NYU Civil Engineering.
Part of a team using stereo cameras for tracking quartz particles in oil flowing through a tunnel. Used computer vision techniques for tracking particle displacement under varying tunnel pressure.

Honors, Societies, Services

2019 Deborah Rosenthal, MD Award for Outstanding Performance on the Ph.D. Qualifying Exam.

2019 Interviewed on NYU's "The Future Of" podcast ([link](#)).

2018 Invited talk at the ARVO Honolulu conference Special Interest Group: "Next-gen Autofluorescence Imaging: let's get ready!"

2018–present Supervised students: Shijie Li (Summer '18–Fall '19; MS research), Michelle La (Fall '19–present; MS thesis), Shishir Lakshminarayan (Fall '18; MS project).

2017–2018 School of Engineering Ph.D. Fellowship from NYU CSE.

2017 Featured in NYU press release ([link](#)).

2017 "Extracting *Meaningful* Features from Data", Invited guest lecture for a graduate Machine Learning class.

2016 Graduate Student Mentor for NYU ECE.

2015–2017 Graduate Student Scholarship from NYU ECE.

various Reviewer for MICCAI ('20), IEEE ISBI ('18-'20), Neuroinformatics ('17-'18).
Student Member of IEEE, MICCAI, SPIE and ARVO.

Publications

Under Review Dey, et al. "Group Equivariant Generative Adversarial Networks", submitted to **ECCV**, 2020.

Ren, Dey, et al. "Segmentation-renormalized Cycle-consistency for Unpaired Image Harmonization", submitted to **MICCAI**, 2020.

Journals Dey, et al. "Tensor Decomposition of Hyperspectral Images to study Autofluorescence in Age-related Macular Degeneration", **Medical Image Analysis**, 2019. (Impact Factor: 8.88)

Conference Papers Dey, et al. "Robust Non-negative Tensor Factorization, Diffeomorphic Motion Correction, and Functional Statistics to Understand Fixation in Fluorescence Microscopy", **MICCAI**, 2019. (Early accept; top 16% of papers)

Dey, et al. "Multi-modal Image Fusion for Multispectral Super-resolution in Microscopy", **SPIE Medical Imaging**, 2019. (Oral Presentation)

Selected Conference Abstracts Gisbert, Dey, et al. "Improved Denoising of Optical Coherence Tomography via Repeated Acquisitions and Unsupervised Deep Learning", **ARVO ISIE**, 2020 (to appear).

Dey, et al. "Consistent Automatic Spectral Signature Recovery of Human retinal pigment epithelium (RPE) Lipofuscin Components and Drusen in Donors with Age-related Macular Degeneration (AMD) using Multi-Excitation Hyperspectral Autofluorescence (AF) Imaging." **Investigative Ophthalmology & Visual Science** 58.8 (2017).

Ach, et al. "High-resolution and multispectral imaging of autofluorescent retinal pigment epithelium (RPE) granules." **Investigative Ophthalmology & Visual Science** 58.8 (2017).

Tong, et al. "Hyperspectral Autofluorescence (AF) and Mechanisms of Retinal Pigment Epithelium (RPE) Lipofuscin Loss in Age-Related Macular Degeneration (AMD)." **Investigative Ophthalmology & Visual Science** 58.8 (2017).

Theses "Tensor Decompositions of Multi-Excitation Hyperspectral Retinal Autofluorescence Imaging with Applications to Age-Related Macular Degeneration", **M.S.E.E. Thesis**, May 2017.

Skills

Languages Python, bash, MATLAB; Novice: C++.

Software & Libraries PyTorch, Tensorflow, Keras, ITK/SimpleITK, Tensor Toolbox, OpenCV, ANTS, ITK-SNAP, FSL, 3D Slicer.

Selected Academic Projects

- Deep Recurrent LSTM-networks for Baseball Game Trajectory Prediction, 2018.
- Multi-light Multi-view 3D Object Reconstruction, 2017.
- Object Detection and Localization using Hierarchical Pixel Voting, 2017.

Relevant Graduate Coursework

Data Analysis Through Optimal Transport, Deep Learning, Probability and Statistics for Data Science, Machine Learning, Computer Vision and Scene Analysis, Artificial Intelligence, Image and Video Processing, Digital Signal Processing I & II, Medical Imaging; Audited: Numerical Methods I.