

# Nikola Janjušević

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## RESEARCH STATEMENT

I am interested in **imaging inverse-problems** and **Deep Neural Networks (DNNs)**. I have focused my Ph.D. on the **interpretable-construction of DNNs**, leveraging this understanding to achieve robustness to inference-time changes in the signal observation model. I believe DNN construction derived from optimization algorithms can yield superior performance and novel capabilities.

## WORK EXPERIENCE

**NYU Langone Dept. Radiology**, NTV Intern  
*Unsupervised training of DNNs for Low-Field MRI denoising and CS-MRI reconstruction.*

Summer 2023 - Present, New York, NY

**Apple Video Engineering**, Research Intern  
*“White-box” reference-guided image enhancement.*

Summer 2022, Cupertino, CA

**Samsung Research America**, Research Intern  
*Survey of fast novel-view synthesis methods for video involving with comparisons on in-house data.*

Summer 2021, Plano, TX (remote)

## TEACHING EXPERIENCE

**The Cooper Union**, Adjunct Professor  
*ECE-150 Digital Logic Design.*

Fall 2022, Fall 2023 New York, NY

**NYU Tandon**, Teacher’s Assistant  
*ECE-GY 6123 Image and Video Processing.*

Spring 2022, Spring 2023, Brooklyn, NY

**NYU Summer STEM**, Senior Instructor  
*Introduction to Machine Learning.*

Summer 2019, Brooklyn, NY

## AWARDS AND HONORS

NYU SHIV PANWAR SCHOLARSHIP 2021-2023

TELEPHONICS RESEARCH FELLOWSHIP 2020

NYU K-12 STEM FELLOWSHIP 2019

RADIO CLUB OF AMERICA SCHOLARSHIP 2019

CU HALF-TUITION SCHOLARSHIP 2015-2019

CU INNOVATOR’S MERIT SCHOLARSHIP 2015-2019

## EDUCATION

**New York University**

Ph.D. Electrical Engineering, GPA: 3.83/4.00

*Advisor: Professor Yao Wang, NYU Video Lab*

Fall 2019 - Present, Brooklyn, NY

**The Cooper Union**

Bachelors of Engineering, Electrical Engineering

*Magna Cum Laude*

*Minor in Computer Science*

Fall 2015 - Spring 2019, New York, NY

**Selected Graduate Courses:**

Math-GA 20(10,20) Numerical Methods I, II

Math-GA 2012 Non-smooth and Convex Optimization

Math-GA 2012 High Performance Computing

DS-GA 3001 Bayesian Machine Learning

ECE-GY 6813 Medical Imaging

**Selected Skills:**

Julia (Lux, CUDA, MPI), Python (PyTorch),

C (OpenMP, MPI), Matlab, Bash, Linux,

L<sup>A</sup>T<sub>E</sub>X (PGFplots, TikZ), Manim

## PUBLICATIONS

- [1] N. Janjušević, A. Khalilian-Gourtani, A. Flinker, and Y. Wang, *Fast and Interpretable Nonlocal Neural Networks for Image Denoising via Group-Sparse Convolutional Dictionary Learning*, preprint 2023. Julia code.
- [2] B. Frost, N. Janjušević, C. Strimbu, C. Hendon, *Compressed Sensing on Displacement Signals Measured with Optical Coherence Tomography*, Biomed. Opt. Express 14, 2023.
- [3] N. Janjušević, A. Khalilian-Gourtani and Y. Wang, *CDLNet: Noise-Adaptive Convolutional Dictionary Learning Network for Blind Denoising and Demosaicing*, IEEE OJSP 2022. PyTorch code.
- [4] N. Janjušević, A. Khalilian-Gourtani and Y. Wang, *Gabor is Enough: Interpretable Deep Denoising with a Gabor Synthesis Dictionary Prior*, IEEE IVMS 2022. PyTorch code.

## CONFERENCES, SEMINARS, TALKS

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27/05/24 L. Bojić and N. Janjušević, *Strategija Razvoja Veštačke Inteligencije Kod Nas / An Artificial Intelligence Strategy for Serbia*, Eduka Institute of Organizational Business, Belgrade, Serbia.

04/05/24 International Society for Magnetic Resonance in Medicine (ISMRM), May 4th - May 9th 2024, Suntec Singapore Convention & Exhibition Centre, Singapore.

- N. Janjušević et al., *Advanced Deep Learning Denoising for Accelerated 0.55T Prostate MRI*, Digital Poster + Power-Pitch Presentation.

- N. Janjušević et al., *Self-Supervised Noise-Adaptive Convolutional Dictionary Learning for Low-Field MRI Denoising*, Digital Poster.

21/02/24 N. Janjušević et al., *Learning Deep Denoisers for Low-Field MRI with Noisy Data*, Research Seminar, The Center for Biomedical Imaging (CBI) and Center for Advanced Imaging Innovation and Research (CAI<sup>2</sup>R), Translational Research Building, NYU Langone Health, New York, NY, USA.

26/06/22 N. Janjušević et al., *Gabor is Enough: Interpretable Deep Denoising with a Gabor Synthesis Dictionary Prior*, Research Presentation, IEEE 14th Image, Video, and Multidimensional Signal Processing Workshop (IVMSP), June 26th - June 29th 2022, Nafplio, Greece.