Alejandro Sztrajman

Nationality: UK, Argentina | ♥ London, UK | □ +44 7492 393393

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Education

PhD in Computer Science

University College London (UCL), London, United Kingdom.

BSc in Physics

University of Buenos Aires (UBA), Buenos Aires, Argentina.

Research Experience

University of Cambridge

Postdoctoral Researcher

Cambridge, UK

Mar 2023 - Present

- Worked at the Rainbow Group with Profs. Rafał Mantiuk and Cengiz Öztireli.
- Co-supervised multiple PhD and MSc students.
- Research Areas: neural fields, hypernetworks, physics-based rendering, generative models, novel view synthesis (3DGS), visual perception.

University College London

PhD Student

London, UK

Sep 2015 - Aug 2022

- Worked at the Digital Reality Lab, under the supervision of Profs. Tim Weyrich and Tobias Ritschel, funded by a Marie-Curie Fellowship.
- Research Areas: neural fields, hypernetworks, physics-based rendering, material appearance, generative models, HDR light representation.

Microsoft Reading, UK

Research Intern

Nov 2019 - Jun 2020

- Worked on face relighting and light estimation with Dr. Eric Sommerlade.
- Published results at 3DV and registered as patent.

Adobe Clermont-Ferrand, France

Research Intern

- Worked on methods for material appearance transfer between renderers.

Aug 2016 - Dec 2016

New York City, USA

Columbia University

Visiting Student

- Worked on physics-based animation of fluids with Prof. Eitan Grinspun.

Mar 2013 - Aug 2013

Publications

¹High-Dynamic-Range Spherical Gaussian Splatting

A. Sztrajman, Y. Cai, Y. Liu, R. Mantiuk. In Preparation.

Keywords: novel-view synthesis, Gaussian splatting.

²Physically-based Neural BRDF

*A. Sztrajman, *C. Zhou, G. Rainer, F. Zhong, C. Oztireli, R. Mantiuk. In Review at ECCV. Keywords: neural fields, physics-informed neural networks.

³FrePolad: Frequency-Rectified Point Latent Diffusion for Point Cloud Generation

C. Zhou, F. Zhong, P. Hanji, Z. Guo, K. Fogarty, A. Sztrajman, H. Gao, C. Oztireli. In Review at ECCV. Keywords: diffusion models, point clouds, spherical harmonics.

⁴Hypernetworks for Generalizable BRDF Estimation

F. Gokbudak, A. Sztrajman, C. Zhou, F. Zhong, R. Mantiuk, C. Oztireli. In Review at ECCV. Keywords: neural fields, hypernetworks, material appearance.

⁵iHyperTime: Implicit Neural Representations for Interpretable Time-Series Generation

E. Fons, A. Sztrajman, Y. El-Laham, A. Coletta, A. Iosifidis, S. Vyetrenko. In Review at TMLR. Keywords: time-series, neural fields, hypernetworks, generative models.

⁶Neural Fields with Hard Constraints of Arbitrary Differential Order

F. Zhong, K. Fogarty, P. Hanji, T. Wu, A. Sztrajman, A. Spielberg, A. Tagliasacchi, P. Bosilj, C. Oztireli. NeurIPS 2023. Keywords: neural fields, hypernetworks, constrained learning.

⁷Color Calibration Methods for OLED Displays

M. Ashraf, A. Sztrajman, D. Hammou, R. Mantiuk. Color Imaging (2023). Keywords: color, neural fields.

⁸Neural BRDF Representation and Importance Sampling *WILEY Top Cited Award

A. Sztrajman, G. Rainer, T. Ritschel, T. Weyrich. Computer Graphics Forum (Oral at EGSR 2022).

Keywords: neural fields, hypernetworks, physics-based rendering, differentiable rendering.

⁹HyperTime: Implicit Neural Representations for Time-Series

E. Fons, A. Sztrajman, Y. El-Laham, A. Iosifidis, S. Vyetrenko. NeurIPS 2022 SyntheticData4ML.

Keywords: time-series, neural fields, hypernetworks, generative models.

10 Machine Learning Applications in Appearance Modeling

A. Sztrajman. PhD Thesis, University College London, 2022.

Keywords: machine learning, computer graphics, computer vision.

$^{11}{\rm Fast}$ Blue-Noise Generation via Unsupervised Learning

*A. Sztrajman, *D. Giunchi, A. Steed. Oral, IJCNN 2022.

Keywords: blue noise, unsupervised learning, signal processing.

$^{12}\mathrm{Mixing}$ Modalities of 3D Sketching and Speech for Interactive Model Retrieval in VR

D. Giunchi, A. Sztrajman, S. James, A. Steed. Oral, IMX 2021.

Keywords: 3D sketch retrieval, virtual reality, convolutional Neural Networks.

¹³High-Dynamic-Range Lighting Estimation from Face Portraits

A. Sztrajman, A. Neophytou, T. Wevrich, E. Sommerlade. Oral, 3DV 2020.

Keywords: convolutional neural networks, HDR light estimation.

¹⁴Image-Based Remapping of Spatially-Varying Material Appearance

A. Sztrajman, J. Krivanek, A. Wilkie, T. Weyrich. JCGT 2019.

Keywords: physics-based rendering and shading, non-linear optimization.

¹⁵An Easy Way to One-dimensional Elastic Collisions

J. Sztrajman, A. Sztrajman. AAPT The Physics Teacher, 2017.

Keywords: physics, education.

¹⁶Image-based Remapping of Material Appearance

A. Sztrajman, J. Krivanek, A. Wilkie, T. Weyrich. Oral, Eurographics 2017 MAM.

Keywords: physics-based rendering and shading, non-linear optimization.

¹⁷Elementary Electromagnetism

J. G. Roederer. Buenos Aires University Press (2015).

Project coordinator and editor for the college-level physics textbook by Prof. Juan G. Roederer.

Patents

Generating Interpretable Time-Series by Meta-Learning with Implicit Neural Representations

E. Fons, A. Sztrajman, Y. El-Laham, A. Iosifidis, S. Vyetrenko. US Patent 2023 (Pending).

Estimating Illumination in an Environment Based on an Image of a Reference Object

A. Neophytou, E. Sommerlade, A. Sztrajman, S. Sengupta. US Patent 2022/0116549 A1.

Blog Posts

Real NVP Networks. A. Sztrajman.

Statistical Analysis – Friedman Test E. Fons, A. Sztrajman.

Skills

Programming: Excellent programming skills in Python. Experienced with C/C++, JavaScript, HTML/CSS.

Technologies/Frameworks: PyTorch, TensorFlow, Scikit-learn, Numpy, Pandas, OpenCV, Blender/Mitsuba, OpenGL/WebGL, PBS, AWS, git, Linux.

Machine Learning: neural fields, hypernetworks, generative models (VAEs, normalizing flows, diffusion models), novel view synthesis (NeRF, Gaussian splatting), convolutional neural networks.

Computer Graphics: physics-based rendering, shading, visual perception, neural rendering, path tracing, HDR lighting, Monte Carlo importance sampling, Image processing.

Science: Solid background in physics and math, including linear algebra, calculus, 3D math, Fourier analysis, PDEs. Communication: English (Fluent), Spanish (Native). Proficient writing skills, and good presentation skills.

Talks

Relightable 3D Gaussian Splatting University of Cambridge, UK.	Dec 2023
Implicit Neural Representations for Material Appearance. University of Cambridge, UK.	Mar 2023
Neural Fields for Data Representation and Generation. Brown University, Providence, USA.	Oct~2022
CNN-based Face Relighting. Microsoft, Seattle, USA (virtual).	$Mar\ 2020$
Neural BRDF Importance Sampling. UCL, London, UK.	Nov 2019
Capture and Editing of Material Appearance. ETH, Zurich, Switzerland.	Feb 2018
Introduction to Convolutional Neural Networks. IST, Klosterneuburg, Austria.	Nov 2017

Teaching

Advanced Graphics and Image Processing (Cambridge)	2023
Introduction to Graphics (Cambridge, Fitzwilliam College)	2023
Advanced Deep Learning and Reinforcement Learning (UCL, COMP0089)	2019
Scientific Programming in Python (UCL)	2017
Principles of Programming (UCL, COMP101P)	2015