Alex **Soares Duarte**

PhD Physicist · Data Scientist

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About Me

I am a PhD physicist and Data Scientist with experience in experimental optics, deep learning and computer vision. I was born in the South of Brazil and moved to Europe in 2011, where I have been working in different countries; Germany (Heidelberg), UK (Oxford), Spain (Barcelona) and currently in The Netherlands (Eindhoven). My professional focus is solving technical challenges, applying physics knowledge and state-of-the-art computational tools, like machine learning and image processing.

Personal Interests: *Cinema*, *Filmmaker*, Music, Museums, Beach, Eating good food, Coffee, Craft Beers, ...

Skills

Programming Python (Advanced), C++ (Basic), LabView (Intermidiate), MatLab (Intermidiate)

Databases Pandas, MySQL, MongoDB, Amazon Web Service, Gogle Cloud Service

Machine Learning tools PyTorch, Tensorflow, Keras, Scipy, Scikit-Learn, OpenCV

Machine Learning Methods U-Net, Faster R-CNN, Autoencoders, XGBoost, ConvNets, PCA, t-SNE

Experience

ASML - Advanced Algorithm Development and Optimization

Eindhoven, Netherlands

Data Scientist

2020 - current

- YieldStar Metrology Overlay Inference
- Physics-Infromed Deep Learning
- High-Voltage SEM simulations
- Technical Competence Leader

ICFO - Institute of Photonic Sciences

Barcelona, Spain

Postdoctoral Researcher

2016 - 2020

- **Molecular Nanophotonics Group** - Prof. Niek van Hulst
- Deep Learning single molecule localization
- Single molecule fluorescence
- Scanning microscopy

Oxford University

Oxford, United Kingdom

Postdoctoral Research Associate

2014 - 2016

- **Kukura Lab** - Prof. Phillip Kukura
- Wide-field microscopy
- Ultrafast spectroscopy
- Biomolecular dynamics

Education

Heidelberg University

Heidelberg, Germany

PhD in Physics

2011 - 2013

- **Motzkus Group** - Prof. Marcus Motzkus
- Vibrational microscopy
- Coherent Raman spectroscopy
- Tissues and carbon nanotubes studies

UFRGS (Federal University of Rio Grande do Sul) — *Porto Alegre, Brazil*

M.Sc. and PhD in Physics — *2009 - 2014*

- **PhD Thesis** - Multiplex CARS applied to carbon nanotubes and brain tissues
- Laboratory instrumentation
- Physics and Optics fundamentals

Projects

Image Processing & Machine Learning — *ASML* ***(Current)***

Projects related with Wafer Metrology

Deep Learning Localization Super-Resolution Microscopy — *ICFO* ***(2020)***

Object detection for single molecule localization image reconstruction

IMC cells segmentation — *Ai.Vali* ***(2019)***

Cells segmentation of imaging mass cytometry images

Endoscopy Image Classification — *Ai.Vali* ***(2019)***

Endoscopy tissues classification with deep learning

Properties Price Prediction — *SharpestMinds* ***(2017)***

Prediction of the sale price of properties in London

Multiplex coherent anti-Stokes Raman scattering microspectroscopy of brain tissue with higher ranking data classification for biomedical imaging — *Journal of Biomedical Optics* ***(2017)***

Christoph Pohling, Thomas Bocklitz, **Alex S. Duarte**, Cinzia Emmanuello, Mariana S. Ishikawa, Benjamin Dietzeck, Tiago Buckup, Ortrud Uckermann, Gabriele Schackert, Matthias Kirsch, Michael Schmitt, Jürgen Popp and Marcus Motzkus

DOI:10.1117/1.jbo.22.6.066005

Wide-Field Detected Fourier Transform CARS Microscopy — *Scientifc Reports* ***(2016)***

Alex Soares Duarte, Christoph Schnedermann, Philipp Kukura

DOI:10.1038/srep37516

Sub-10 fs Time-Resolved Vibronic Optical Microscopy — *J. Physical Chemistry Letters* ***(2016)***

Christoph Schnedermann, Jong Min Lim, Torsten Wende, **Alex S. Duarte**, Limeng Ni, Qifei Gu, Aditya Sadhanala, Akshay Rao, and Philipp Kukura

DOI:10.1021/acs.jpclett.6b02387

Barrierless Photoisomerization of 11-cis Retinal Protonated Schiff Base in Solution — *Journal of American Chemistry Society* ***(2015)***

Giovanni Bassolino, Tina Sovdat, **Alex Soares Duarte**, Jong Min Lim, Christoph Schnedermann, Matz Liebel, Barbara Odell, Timothy D. W. Claridge, Stephen P. Fletcher and Philipp Kukura

DOI:10.1002/10.1021/jacs.5b06492

Chemical imaging of lignocellulosic biomass by CARS microscopy — *Journal of Biophotonics* ***(2014)***

Christoph Pohling, Christian Brackmann, **Alex Duarte**, Tiago Buckup, Annika Enejder and Marcus Motzkus

DOI:10.1002/jbio.201300052

Mapping impurity of single-walled carbon nanotubes in bulk samples with multiplex coherent anti-stokes Raman microscopy — *Nano Letters* ***(2013)***

Alex S. Duarte, Jean Rehbinder, Ricardo R. B. Correia, Tiago Buckup and Marcus Motzkus

DOI:10.1021/nl304371x