# Simone De Camillis

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sdecamillis.github.io



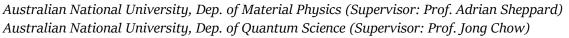
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# **Professional Experience**

## **Research Fellow**

Jan 2021 - Present





- Designed and developed interferometric-based optical systems for volumetric imaging of crystals and 3D mapping of inclusions.
- Modelled imaging errors caused by opto-mechanical distortions and environmental instabilities. Developed suitable correction algorithms and standard calibration procedures.
- Coordinating optical R&D projects of the SmartLight team, ensuring alignment and effective communication with all stakeholders.
- Assessing system limitations and providing actionable recommendations for improvement.
- Conducting statistical analysis of data and targeted 3D data visualisation to evaluate performance.

### Research Fellow

Jan 2019 - Jan 2021

*Macquarie University (Supervisor: Em. Prof. Jim Piper)* 

ARC Centre of Excellence for Nanoscale BioPhotonics (<a href="mailto:cnbplegacy.org.au/imaging">cnbplegacy.org.au/imaging</a>)



- Led research projects to analyse the optical properties of quantum dots and nanoparticles, enabling advances in super-resolution microscopy.
- Developed a bench-top free-space confocal microscope upgrading hardware and software components to support biomedical imaging applications.
- Conducted numerical studies to assess the feasibility of Non-Linear Structured Illumination Microscopy (NL-SIM) applied to lanthanide nanoparticles.

#### **Instrumentation Engineer**

Jan 2018 - Dec 2018

CEA Centre, Paris-Saclay, France (Supervisor: Dr. Olivier Boulade)



- Developed optical experiments to characterise the quantum efficiency and sub-pixel response of CMOS detectors for space applications.
- Designed and implemented numerical simulations of illumination patterns at the focal plane to guide experimental design.
- In collaboration with ESA (European Space Agency) and ONERA (The French Aerospace Lab).

# **R&D Engineer**

Jan 2017 - Dec 2017

General Electric - Grid Solutions, Lisburn, UK (Supervisor: Dr. Chris Calvert)



- Researched and assessed new electro-optical solutions for gas detection to support and enhance GE products.
- Conducted experiments and data analysis to validate the performance and reliability of impedance sensors in measuring hydrocarbon concentrations.
- Designed and implemented a correction algorithm using field data, enhancing the accuracy and extending the lifespan of gas sensing detectors.



## Skills

### Leadership

- > Management of the SmartLight optical laboratories.
- ➤ Head researcher for projects on microscopy (Macquarie) and spectroscopy (QUB).
- > Representative of early career researchers within the CNBP Centre of Excellence.

#### Instrumentation

- Optics: Pulsed and continuous-wave lasers, polarisation control, harmonic generation, chirped pulse compensation, interferometry, spectral analysis, singlephoton detection, fibre fusion splicing.
- > Imaging: confocal microscopy, super-resolution imaging, structured illumination microscopy, optical coherent tomography, transmission tomography, tunnelling electron microscopy.
- > Instrumentation for ultra-high vacuum and cryogenic conditions.
- > Analog/digital signal generation and processing.

#### **Programming**

- ➤ Simulations and data analysis: Phyton, MATLAB, C, Fortran, ImageJ, Paraview.
- > Control software: LabVIEW, Python.
- > Optical and mechanical design: OpticStudio Zemax, SolidEdge, SolidWorks.
- > Drawings: Inkscape, Blender.
- Version control: Git.
- > Editing: Latex, Office.
- > Project management: Jira, Confluence.
- > Geographic Information Systems: QGIS, ArcGIS Pro.

#### Communication

- > 15 peer-reviewed papers published in international journals (see ORCID profile).
- ► 6 talk/poster presentations at international conferences.
- ➤ Teaching the postgraduate class Advanced Imaging Methods and Systems (PHYS8721, ANU, 2021-2023).

# **Training and Schools**

Apr- May 2025	<b>Introduction to ArcGIS Pro (GIS400 online course)</b> delivered by the Australian National University
Apr 2025	<b>Regression in Machine Learning</b> course delivered by the Queensland Cyber Infrastructure Foundation (QCIF).
Mar 2025	<b>Deep Learning for Image Classification</b> workshop delivered by the Queensland Cyber Infrastructure Foundation (QCIF).
Jul 2024	Online course of "Introduction to Meteorology" delivered by the Bureau of Meteorology.
Feb-Apr 2024	Online courses "Optical Efficiency and Resolution" and "Design of High-Performance Optical Systems" delivered by Coursera (University of Colorado Boulder).
Jun 2018	<b>School on visible and IR detection</b> at the Observatoire de Haute Provence, France. Instrumentation, detectors and data analysis for Astronomy and Astrophysics.
Jan-Apr 2016	<b>Visiting Researcher</b> at the Institute of Photonics and Nanotechnologies, Milan, Italy. Project: "Ultrashort UV pulse production for next-generation pump-probe measurements".
Jul-Aug 2013	<b>PRACE Summer of High-Performance Computing</b> at the Univ. of Edinburgh, UK. Project: Developing post-processing visualisation procedures combining the advanced features of Paraview with the computational power of supercomputures.
July 2012	21st Summer School of Parallel Computing at the Cineca centre, Bologna, Italy.

Theory and practice of parallel computing, MPI, OpenMP, hybrid programming.

# Grants and Awards

Jan 2020	<b>Collaborative Seed grant</b> from Biophotonics Career Workshop at Swinburne University of Technology (AUD 2,500).
Nov 2020	Postdoctoral Fellowship from CNBP Centre of Excellence at Macquarie University.
Sep 2015	Short-term Scientific Mission grant from European COST Action (~AUD 4,100).
Jan 2015	Travel grant from European COST Action.
Dec 2013	Short-term Scientific Mission grant from European COST Action (~AUD 4,000).

# Education

## Doctor of Philosophy (Ph.D.) in Optical Physics

Oct 2013 - June 2017

School of Mathematics and Physics, Queen's University Belfast, UK (Supervisor: Dr. Jason Greenwood)

Thesis: "Ultrafast Dynamics in Gas-Phase Building Blocks of Life"

(pure.qub.ac.uk/en/studentTheses/ultrafast-dynamics-in-gas-phase-building-blocks-of-life).

# Laurea Magistrale (Master of Science) in Plasma and Condensed Matter Physics

Oct 2010 - July 2013

University of Pisa, Italy (Supervisor: Prof. Francesco Califano)

Thesis: "Fluid modelling of pressure anisotropy effects in a magnetized plasma" (Final mark: 110/110)

## Laurea Triennale (Bachelor of Science) in Physics

Oct 2008 – July 2010 University of Pisa, Italy

Final mark: 110/110 with honours