

Andre A. M. Munoz

Tel: +44 (0)7497 825556 **Web:** www.andremunoz.me **Email:** andre.munoz@me.com

Personal Statement

A postgraduate with a background in applied physics, investigating advance methods of X-ray imaging for defence and security applications. Seeking to apply transferable and technical skills to the science, engineering and technology industry and learn new skills along the way. Previous experience has enabled the development of outstanding problem solving skills and innovative thinking, which has been previously applied by introducing 3D printing to rapid prototype low-cost coded masks optics with self-supporting properties. Other skills include, very good written and oral communication skills, which has been demonstrated via publishing journal articles, thesis writing and presenting at national and international conferences.

Education

- | | |
|---------------------|---|
| Jan 2015 - Dec 2018 | Ph.D Applied Physics, Cranfield University, Shrivenham, U.K <ul style="list-style-type: none">• Thesis Title: 'Imaging Near-Field Backscattered X-Rays using Pinhole and Coded Masks'• Project: Worked on a classified government-funded (Dstl) project investigating coded mask optics for X-ray backscatter imaging at the Defence Academy of the United Kingdom. |
| Sep 2012 - Jul 2014 | BSc. (Hons) Astrophysics, [2:1], Aberystwyth University, Wales, U.K <ul style="list-style-type: none">• Thesis Title: 'Impact Flashes on the Moon: Cosmic Ray Analysis'• Modules: Data Handling & Statistics, Mathematical Physics, Experimental Physics, Quantum Mechanics, Thermal Physics, Probing Atoms & Molecules, Electromagnetism, Condensed Matter, Cosmology, Planetary Atmospheres and Solar Interior. |
| May 2009 - Jun 2012 | BSc. Natural Science, Open University, Milton Keynes, U.K <ul style="list-style-type: none">• <i>Transfer to Aberystwyth University.</i>• Modules: Practising Science, Electromagnetism and Mathematical Methods & Models. |

Work Experience

- | | |
|---------------------|--|
| Jan 2015 - Dec 2018 | Graduate Researcher, Cranfield Forensic Institute, Shrivenham, U.K <ul style="list-style-type: none">• Designed, constructed and tested an X-ray backscatter imaging system using coded masks for near-field applications, which included in-depth research into X-ray optics and photonics.• Applied innovative thinking through rapid prototyping to provide a low-cost alternative to coded mask imaging that could find applications in medical radiography, industry and defence and security.• Used extensive knowledge of the MATLAB programming language to write signal processing algorithms for image reconstruction, by applying cross-correlation and blind deconvolution. |
| May 2013 - Sep 2013 | Internship, University College London, London, U.K <ul style="list-style-type: none">• Collaborated in novel research designing, testing and installing a fibre optic spectrometer to a telescope, eliminating unwanted imaging effects from the flexure of a CCD extension tube.• Involved as part of a team planning, organising and cataloguing literature. The project took place at University London Observatory in Mill Hill with the purpose of creating a library to assist students in their studies and research. |
| Oct 2010 - Feb 2013 | Director & Product Reviewer, Mobilemodyfi Ltd, London, U.K <ul style="list-style-type: none">• Created and maintained a small online store from the ground up selling accessories for electronic handheld devices. The project involved web designing/maintenance using knowledge of HTML and Adobe Dreamweaver, and forming an inventory and payment infrastructure using Sagepay and Romancart.• Performed video/written reviews for many companies promoting product sales, which involved professional video editing, product photography and web designing. |

Summary of Skills

- **IT Skills** Confident user in Microsoft Windows, Macintosh OSX, Linux and Microsoft Office suites. Experience using MATLAB to building image processing and encryption software, python for data calculations and processing, Fortran 90/95 for modelling physics problems, and HTML and L^AT_EX to create websites and technical documents.
- **Signal Processing** Experience in digital image processing using correlation/deconvolution and the Fourier transform to encrypt and de-crypt exposures. Performed image analysis calculating signal-to-noise ratio, contrast-to-noise ratio and spatial resolution.
- **Engineering Skills** Experience in 3D printing and rapid prototyping to fabricate high density imaging apertures, and manufacturing tertiary alloys. Designed X-ray optics using CAD (SOLIDWORKS).
- **Project Management** Aided the direction of a government-sponsored Ph.D project which included, time management, experimental planning, and supervising interns and students participating in MSc programs.
- **Innovative Thinking** Derived novel solutions and published the findings in journal manuscript and conference proceedings.
- **Communication** Authored and co-authored technical papers and presented two oral talks at an international conference (SPIE Optics + Photonics 2017, San Diego). Experience communicating non-technical work by presenting regular deliverables in the form of project update reports and powerpoint slides to sponsors.
- **Excellent Problem Solving** Applied scientific methods to find possible causes and solutions to problems in the field of X-ray imaging and radiography. Other skills include excellent problem solving and innovative thinking by introducing 3D printing to manufacture coded masks with self-supporting structures and providing a low-cost alternative to coded mask imaging.

Extracurricular Activities & Interests

- **Memberships** Royal Astronomical Society Fellow and an Associate member of the Institute of Physics.
- **Achievements** Full clean car & motorcycle license, and Professional Association of Diving Instructors (PADI) open water certificate.
- **Interests** Keen amateur astronomer and photographer who attends meet up photography groups to share ideas and learn new skills. Cycling, flying and travelling is another passion with journeys within the U.K and abroad including; mainland Spain, Majorca, Canary Island, Morocco, Thailand, Cuba, Jamaica, Iceland, U.S.A & Canada.

Journal Publications

Andre A. M. Munoz, Anna Vella, Matthew J. F. Healy, David W. Lane, Ian Jupp, David Lockley, (2018), "*Low open fraction coded masks for x-ray backscatter imaging*", Opt. Eng. 57(9), 093108 , doi: 10.1117/1.OE.57.9.093108.

Andre A. M. Munoz, Anna Vella, Matthew J. F. Healy, David W. Lane, Ian Jupp, David Lockley, (2018), "*Rapid prototyping-coded masks for x-ray backscatter imaging*", Opt. Eng. 57(8), 085104 , doi: 10.1117/1.OE.57.8.085104.

A. Vella, A. A. M. Munoz, M. J. F. Healy, D. W. Lane, D. Lockley., (2018), "*An artificial X-ray wire test emitter and calculations on the resolution and field of view of X-ray pinhole optics by simulation*", Nuclear Inst. and Methods in Physics Research, A., Elsevier.

Conference Proceedings

[Invited Paper], Munoz, A. A. M., Vella, A., Healy, M. J. F., Lane, D. W., Jupp, I., Lockley, D., (2017), "*X-ray backscatter radiography with lower open fraction coded masks*", Proc. SPIE 10393, Radiation Detectors in Medicine, Industry, and National Security XVIII, 103930A.

[Invited Paper], Munoz, A. A. M., Vella, A., Healy, M. J. F., Lane, D. W., Jupp, I., Lockley, D., (2017), "*3D-printed coded apertures for x-ray backscatter radiography*" Proc. SPIE 10393, Radiation Detectors in Medicine, Industry, and National Security XVIII, 103930F.