Amin Din, Ph.D. Student

"The day you stop learning is the day you die"

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RESEARCHER/ENGINEER/PHYSICIST

With a solid background in Mechanical Engineering and a desire to learn, I am naturally driven to pursue a research career. My passion for working with state-of-the-art equipment, exciting projects and delving deeper into optics and material science has led me to specialise in laser surface engineering. With a diverse background, I am excited to bring my technical skills, problem-solving abilities, and passion for research to a dynamic and innovative environment, where I can continue to improve and contribute to the advancement of photonics.

PUBLICATIONS

[1] R. Uren, A. Din, S. Wackerow, Bez, E., Pfeiffer, S., Rimoldi, M., Himmerlich, M., Taborelli, M. & A. Abdolvand, "Out of focus ultrafast processing of metals for reduced secondary electron yield", OME, 2023

[2] Amin Ahmed Din, R. Uren, A. Fontenla, S. Pfeiffer, E. Tabares, S. Zolotovskaya, A. Abdolvand , (2024). "Modelling laser modified secondary electron yield response of surfaces." Journal of Physics D: Applied Physics

[3] Robin Uren, A. Din, H. Neupert, S. Pfeiffer, A. Moros, M. Barnes, G. Favia, M. Himmerlich, A. Abdolvand, (2024). "Ferrites with minimised secondary electron yield." To be submitted.

EDUCATION

Ph.D., Mechanical Engineering, University of Dundee (STFC and CERN) 2021 – 2024
Thesis: Laser surface engineering for reduction of secondary electrons for materials in the Large Hadron Collider.

BEng (Hons), Mechanical Engineering, (IMechE Accredited), University of Dundee 2017 - 2021
Thesis (Awarded best thesis and student): Fully Autonomous Collecting and Sorting Mobile Robot
Modules: Engineering Design, Computer Aided Engineering, Robotics & Mechatronics, Control & Dynamical Systems, Fluid Mechanics, Solid Mechanics, Mechanics of Machines, Thermodynamics, Engineering Materials.

RESEARCH EXPERIENCE

Ph.D. Supervised by Prof. Amin Abdolvand Sep 2021 - Present
University of Dundee

- Involved in reducing the secondary electron yield (SEY) of ferrite kicker magnets used in the Large Hadron Collider (LHC), never been done before, paper pending [3].
- Involved in reducing SEY of copper beam screens used in the LHC with a novel approach permitting processing at varied focal lengths [1].
- Directed UV, visible and IR beams along an organised, designed path for laser processing.
- Characterised laser beam profiles and properties including manipulating the beam size and intensity profile for a range of applications. Specifically for example, to extend the focal depth of a gaussian beam by converting it into a Bessel beam [1].
- Extensively studied the role of surface composition and geometrical features on the SEY.
- Characterised unstudied materials' optical properties in order to determine lasing parameters.
- Measured the ablation damage threshold of both metals and ceramics irradiated by picosecond/femtosecond pulses from 257-1030nm in order to optimise lasing parameters.
- Investigated ultrafast light-matter interaction and used this knowledge to optimise lasing parameters.
- Developed a mathematical model that can determine the SEY of a material subjected to ultrafast laser irradiation. The model was derived from published papers and tailored to our experimental conditions. Offering novel insight into the theory behind why laser-engineered surface structuring reduces the SEY [2].

- Characterised nanostructures and their effects on SEY using Scanning Electron Microscopy (SEM) and X-ray photoelectron spectroscopy (XPS) data.
- Edited and reviewed papers for the Journal of Laser Micro/Nanoengineering.

COAS Contract Researcher - Supervised by Mike Barnes, SY-ABT Department Aug 2023 - Sep 2023
CERN - European Organisation for Nuclear Research

- Research into laser structuring for reduced SEY and increased electrical breakdown in accelerator beam transfer components.
- Collecting data on laser structuring project and establishing future collaberation.
- Presenting research to multiple departments, following smaller discussions in order to figure out next steps.
- Discussing how to improve modelling paper draft and proposing further experimental studies [2].

Ph.D. Visiting Researcher - Supervised by Marcel Himmerlich, VCS Department May 2022 - May 2022
CERN - European Organisation for Nuclear Research

- Meeting with the surface engineering team to discuss optical setups, fiber optics, collecting data on samples made in the laboratory and characterising samples with more sophisticated techniques, SEY, SEM, EDX...

SKILLS

Software Skills	Python/MATLAB, SOLIDWORKS, Blender, CST Particle Studio, ANSYS (FEA/CFD), Microsoft Office, LaTex, ImageJ, Inkscape, Beamguage, WEBOTS.
Professional Skills	Optical system design and alignment, nonlinear optics, characterising material properties, microscopy operator, processing metals and ceramics.
Transferable Skills	Analytical thinker, networking, presenting, ability to assimilate new information and simplify complex phenomena, team player, project management, adaptable and driven.

AWARDS AND HONOURS

Optica, Siegman International School on Lasers, McMurtry prize, $200 **(2023)**

David Smith Award, $2500 **to visit CERN (2023)**

3 Minute Thesis Runners Up (2022)

STFC/CERN Ph.D. Scholarship (2021)

IMechE – Frederic Barnes Waldron Best Student Award (2021)

IMechE Best Project Award (2021)

University of Dundee Best Student Award (2021)

Dundee – East China University of Science and Technology Scholarship (2018)

EXTRA-CURRICULAR ACTIVITIES AND PROJECTS

- Dundee PGR Symposium Presentation [2]
- SCOT Conference Research Presentation [1]
- SCOT Conference Organising Committee Member
- CLEO Europe Research Poster Presentation [2]
- Optica Chapter President (2022 – Present)
- Postgraduate Research Representative (2023 – Present)
- Optica Member (2022 – Present)
- IMechE Affiliate Member (2019 – Present)
- STEM Ambassador (2020 – 2023)
- Honours Project (2021)
- St Andrews Observatory (2020)
- Michelin Internship (2018)

REFERENCES AVAILABLE UPON REQUEST