Max Valentine, PhD

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Education

University of Bath | Bath, UK
PhD Programme in Mechanical Engineering
2019 – 2023

Graduation January 2024: "The design of an athlete specific spike plate for skeleton"
- → Utilised an interdisciplinary approach to investigate the mechanical properties of ice and human-equipment interactions to design and manufacture athlete-specific spike plates.
- → Communicated technical subjects to industrial partners in quarterly update meetings.
- → Defined the scope, planned, and delivered multidisciplinary investigations of traction on ice:
  - Investigated ice's impact response to custom spike impactors using a modified low velocity drop test rig at different temperatures.
  - Characterised the unique biomechanical characteristics of a bent-over downhill sprint using 2D SPM methods for hypothesis testing in MATLAB.
  - Created and validated a FEA simulation of localised impacts on ice in ABAQUS.
  - Developed a scan-to-manufacture workflow for additively manufactured spike plates.
- → *Supervised by Professor Vimal Dhokia, Dr Elise Pegg, and Dr Steffi Colyer*

MEng (Hons) Mechanical Engineering
2015 – 2019
- → Final Classification 2:1

The York School | Toronto, Canada
2011 – 2015
- → IB Diploma: 39 Overall & OSSD Diploma: 94.9%

Professional Experience

British Bobsleigh & Skeleton Association | Bath, UK
Product Engineer
March 2021 – February 2022

Designed and manufactured three rounds of prototypes of personalised spike plates for British Olympic skeleton athletes for use by two athletes at the 2022 Beijing Winter Olympic Games.
- → Created parametric data-driven model based on plantar pressure data, ice impact response, and athlete preference in Grasshopper for Rhino3D to optimise personalised spike plates.
- → Manufactured prototypes and collected qualitative feedback to iterate on design changes.
- → Conducted plantar pressure data testing to collect key information to uniquely tailor designs.
- → Met high-pressure time-sensitive deadlines with limited resources as set by the EIS and BBSA.
- → Negotiated the overall project outputs and scope to link the shoe project to my PhD.

Thermal Energy International | Bristol, UK
Engineering Intern
July 2018 – September 2018
- → Calculated pressure vessel requirements to help to bring a new product to the market.
- → Communicated outcomes to stakeholders and customers using CAD drawings and otherwise.

Research Experience

ADDCUR Project | Bath & Bristol, UK
January 2022 – August 2022

EPSRC funded research project between the University of Bath and University of Bristol, investigating the feasibility of using metal additive manufacturing for composite mould tools.
- → Collaborated with academics from Bristol Composites Institute to learn and understand what characteristics are required for a high performing and energy efficient composite mould tool.
- → Designed and manufactured 30+ novel metal AM composite mould tools across 3+ builds.
- → Tested the tool performance to develop the workflow from flat tools to complex geometries.

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Research Experience (cont.)

AM Powder Project | Bristol, UK

March 2020 – March 2021

Research project investigating the strain relief, phase change, and oxidation in metal AM powders.

- → Learned new theory to process high resolution synchrotron XRD data from Diamond I11 Beamline using TOPAS software of common metal AM powders for a high impact publication.
- → Analysed data to gain key insights into the material properties during in situ heating to 700°C.

Skills

Communication

Research Presentations

- → Won **Best PhD Student Presentation Award** at the UK Sports Engineering Seminar Day 2022.
- → Presented my research at 3 international conferences and 2 internal University seminars.

Teaching Assistant

- → Taught and performed lab demos for students across 6 MEng (Hons) & MSc modules.

People and Project Management

Master's Project Supervisor

- → Supervised 6 11-week master's projects for final year MEng (Hons) students.
- → Advised students daily on the design of experiments, CAD, and their overall progress.
- → Consulted in design modifications for reliability and support removal for metal AM.
- → Edited and co-wrote an article resulting from one student's project who is now doing a PhD.

Technical

→ Additive Manufacturing	→ CAD	→ Rhino3D	→ MATLAB
→ Qualitative Data Collection	→ Inventor	→ Grasshopper	→ LaTeX
→ Biomechanical Testing	→ ABAQUS	→ C#	→ Microsoft Office
→ Impact Testing	→ PowerShape	→ XRD	→ Adobe Creative Cloud

Extra-Curricular Activities

TCS London Marathon | London, UK

April 2023

- → Fundraised £3800 for Mind Charity and ran my first marathon at the 2023 London Marathon.
- → Planned training around work, displaying time management and discipline to long term goals.

Bath University Boat Club | Bath, UK

September 2015 – July 2022

- → Mentored and advised new athletes in the club 2020-22.
- → Qualified for the Temple Challenge Cup at Henley Royal Regatta in 2019.
- → Won the LM4x Bronze Medal at the EUSA Games in Coimbra, Portugal in 2018.
- → Responsible for fleet of boats as Equipment and Safety Officer for the club in 2016-17.

Interests

→ Ice Hockey → Running → Tennis → Rowing → Photography → Formula 1

Additional Information

LinkedIn://-MaxValentine Research Portal://Max-Valentine

- → References available upon request.