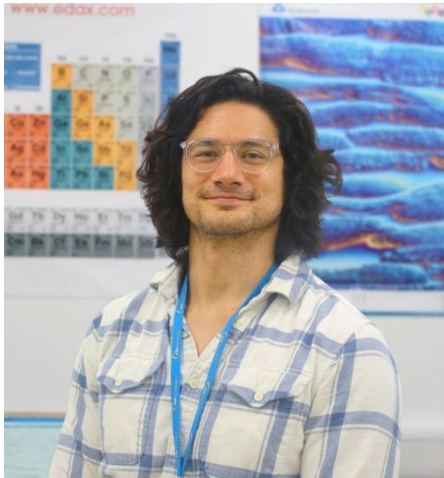




Dr Gary Edward Bywater

Job Title: Principal Metallurgist, ESR Technology Ltd.
<https://esrtechnology.com/about-us/meet-the-team/>

Qualifications: PhD Metallurgy (Development of high temperature alloys), MSc Civil Eng., BEng (Hons) Mech. Eng.

Nationality: British

DOB: 31/01/1986

Key Skills: Materials Science, metallurgical production quality, root cause failure analysis (RCFA), forensic engineering, experimentation, heat treatment, corrosion, material selection, material design review, mechanical testing, metallography/materiallography, material characterisation (SEM/EDX/EBSD/XRD).

Email : gary.bywater@esrtechnology.com

Tel: +44 (0)7747782754

LinkedIn: www.linkedin.com/in/gary-bywater-phd-28926b4a

Expert witness experience

- **July 2025 – Materials/fractographic analysis of damaged gas explosion components.**
 - As supporting expert.
 - Practical component inspection/photography performed at the HSE, Buxton.
- **Nov to Dec 2025 – Practical metallurgical laboratory analysis of inclusions in wind turbine components.**
 - As supporting expert.
 - Lead authored the metallurgical inclusion report.
- **Feb to June 2026 – Practical fractographic laboratory analysis of wind turbine components.**
 - As supporting expert.
 - Lead authored the fractographic analysis report which was submitted to the court.
- **March 2026 – Metallurgical review of steam turbine blade failure analysis reports.**
 - As supporting expert.
 - Desk based activity.
- **April 2026 – Metallurgist review of the corrosion related failure of an HVAC system.**
 - As lead expert.
 - Desk based activity, the report was submitted to the court.
- **Aug 2026 – Metallurgist review of the non-conformance and failure analysis of aluminium alloys.**
 - As lead expert.
 - Desk based activity.

Contact Us:

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info@esrtechnology.com

Career History & Project Examples

- **Principal Metallurgist at ESR Technology Ltd (May 2024 – Present).**
 - Investigation of rail diesel engine cylinder head failures impacting the operation of a client's fleet.
 - Cracking and failure investigation of safety critical hydraulic components used for large vehicles.
 - Investigation of weld defects causing the failure of a safety critical railway cardan shaft.
 - Corrosion inhibitor testing of 7075 T6 aluminium alloys for railway fleet applications.
 - Wear and failure analysis of safety critical aerospace actuator and hydraulic components.
 - Investigation of train body panel weld cracks influencing the safety of the client's fleet.
- **Lead Metallurgist at David Brown Santasalo Defence, UK (Oct 2023 – May 2024).**
 - Metallurgical lab quality sign-off for carburised forgings (≤ 20 Ton, ~£250k) for maritime defence clients.
 - Optimisation of heat treatment processes for the improved quality of carburised gear steels.
 - Investigation of inclusion-initiated quench cracking failure of large, carburised gear forgings.
 - Investigation of thermally grown oxides in carburised gear steels impacting quality and fitness for sale.
 - Induction softening process development of splined bevel gears for land defence vehicles.
- **Materials Engineer at Red Bull Powertrains 2026 Ltd (March 2023 – Sept 2023).**
 - Investigation of the valve seat wear of Formula 1 prototype cylinder heads causing engine power loss.
 - Failure analysis of Formula 1 prototype cylinder head cracking.
 - Authoring of manufacturing quality process documents.
- **Metallurgist/Senior Metallurgist at Pyrotek Engineering Materials Ltd (Feb 2018 – March 2023).**
 - Molten aluminium corrosion/degradation testing of refractory ceramics.
 - Investigation of melting furnace degradation due to molten aluminium and combusting heating.
 - Investigation of nickel alloy rebar failure due to high temperature furnace conditions.
 - Investigation of the non-metallic inclusions of aluminium slabs putting € 1 mil. of stock at risk to stakeholders.
 - Investigation of the thermal degradation of cast irons and material selection in molten aluminium.
 - Filtration efficiency and integrity assessment of ceramic filters used for molten aluminium processing.
- **Materials Specialist at BMW Swindon Pressings Ltd (April 2015 – Feb 2018).**
 - Investigation into the influence of oil distribution upon the sheet metal formability of large car body panels to increase production yield.
 - Failure analysis of gantry bolts used for heavy lifting of press-shop tools.
 - Investigating the forming limit analysis of car body panels to improve press-shop production yield.
- **Advanced Technology Research Engineer at Honda Engineering Europe Ltd (March 2014 – April 2015).**
 - Review and monitoring of emerging manufacturing technologies via conference attendance, factory visits, and supplier meetings. Typically, in Germany.
 - Co-management of CFRP laser cutting R&D project.

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Education

- Sept 2009 – Feb 2014: PhD in Materials Science & Engineering, The University of Sheffield.
Thesis title: *“A study on the microstructure and high temperature oxidation of Nb-silicide based alloys with Hf and Ge or Al additions and the NbCr₂ Laves phase”*
Link to thesis: <https://etheses.whiterose.ac.uk/id/eprint/17999/>
- Sept 2008 – Aug 2009: MSc Earthquake and Civil Engineering Dynamics (Pass), The University of Sheffield.
- Oct 2005 – Aug 2008: BEng (Hons) Mechanical Engineering (2:1), The University of Hull.

References

Head of Business Performance & HSE, David Brown Santasalo Defence UK – Ms Joanne Spalding
UK Quality Manager, David Brown Santasalo Defence UK – Mr Jacob Edmunds
Metallurgist, David Brown Santasalo Defence UK – Ms Ruby Davenport
Product Manager Fibre & Converted Products (EMEA), Morgan Advanced Materials Plc. – Dr Julie Payne
Pyrotek European R&D Centre and MSG Lab Manager – Mr Mark Vincent
Materials Engineer, Red Bull Powertrains 2026 Ltd. – Dr Tom Taylor
Group Leader Launch Control, BMW Mini Plant Oxford & Swindon - Mr Jon Neill
Propulsion Control System Integration Lead Engineer, JLR - Mr Mankin Lee
Metallurgist, Independent Forgings and Alloys - Dr Andrew Twedde
Through Process Metallurgist, Liberty Special Steels – Dr Jack Nelson
PhD Supervisor, University of Sheffield – Emeritus Prof Panos Tsakiroopoulos
(contact details available upon request)

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