

****Exploring the use of Artificial Intelligence for flood forecasting in Scotland****

The Centre of Expertise for Waters (CREW) intends to commission a **Science Policy Fellowship** aligned with CREW's Hydrological Extremes, Coasts and Risk Management Theme which supports flood forecasting in Scotland.

Background

The Scottish Environment Protection Agency (SEPA) serves as the national authority for flood forecasting in Scotland. Their role is critical in mitigating flood risks, protecting communities and enhancing preparedness for flood events. As part of the *Flood Warning Development Framework (2022-2028)*, SEPA outlined its strategic aim to upgrade its forecasting capabilities through targeted development and innovation. This Flood Warning Development Framework reflects SEPA's commitment to adopt advanced technologies and methodologies.

One key area of emerging innovation that SEPA, Scottish Water and Scottish Government would like to explore is the application of Artificial Intelligence (AI) in flood forecasting. AI offers the potential to transform flood forecasting by analysing large datasets, recognizing patterns, and providing real-time predictions. AI tools provide the opportunity to strengthen SEPA's ability to anticipate flood events, optimize response strategies and safeguard Scotland's environment and population.

The Ask/Scope

CREW invites proposals for a c.3-month Science Policy Fellowship to undertake a rapid evidence review of the current and emerging capabilities of AI to support and enhance flood forecasting capabilities.

Through a rapid evidence review, the project should:

- Explore the emerging use and application of artificial intelligence (AI) in the research community¹, particularly machine learning, to support flood forecasting.
- Assess the feasibility of machine learning as an alternative to traditional physical-based rainfall-runoff modelling currently used in flood forecasting.
- Identify opportunities and challenges associated with adopting AI capabilities to support flood forecasting in Scotland.
- Provide future recommendations, including a 5-year roadmap, to guide the development and integration of AI in flood forecasting efforts.

Deliverables

- A report of 15-20 pages, excluding references and appendices
- A plain English summary (up to 1 page)
- Website summary (including image or photograph) (200 words)

Meetings

- (2-3) Project Steering Group meetings online (throughout the project lifecycle)

¹Please consider both the UK and international research community.

Further information for applicants

Overview

CREW **Science Policy Fellowships** intend to support evidence-based decisions by providing the opportunity for Scotland's research community to advocate for critical science that addresses upcoming water-related policy, regulatory and/or industry needs. This 'research-push' workstream compliments CREW's 'policy-pull' Capacity Building and Call Down workstreams in facilitating exchanges of expert knowledge between Scottish Higher Education Institutes (HEIs) and Research Institutes, and policymakers, regulators, and industry representatives.

Eligibility

CREW Science Policy Fellowship funding is open to applications from **all relevant Scottish HEIs and Research Institutes (approved subcontractors)**. Approved subcontractors have received a copy of CREW's Terms and Conditions. CREW encourages applications from experienced to early career researchers (ECRs) under the supervision and mentorship of experienced researchers.

Expectations and award criteria

A copy of expectations and the award criteria are provided overpage.

Project management

Day-to-day communication will be between the research/review team (the contractor) and a CREW Project Manager and is likely to involve short catchups as agreed.

Pre-contract meeting

A CREW representative, and potentially 1-3 representatives of Scottish Government and its delivery partners, will meet with the preferred bidder(s) for a pre-contract meeting. A pre-contract meeting between will take place approximately **wb.3rd March 2025**.

Anticipated timescale (c. 3 months)

The project will commence approximately **5th March 2025**, depending on contract processing and signature, with the project outputs signed off by the CREW Director by **31st May 2025**.

Funding

The maximum amount of funding available **exclusive of VAT** (where applicable) is **£40,000**

Submitting a proposal

Please complete a **CREW Science Policy Fellowship application form** outlining your proposal.

Proposals need to be submitted to Procurement@crew.ac.uk for evaluation **by Friday 14th February 2025, midday**. We aim to notify the successful bidder by **c. wb.24th February 2025**.

Please contact Procurement@crew.ac.uk by **Friday 7th February** if you would like any clarification on any of the above. You should highlight any potential conflicts of interest in your proposal. For queries about what may constitute a potential conflict of interest please contact the CREW Manager (Nikki.Dodd@hutton.ac.uk).

Expectations

No.	Criteria	Descriptor
1	Duration	The proposed duration will align closely to the details provided in the anticipated timescales section of the specification.
2	Staff time and effort	The proposed allocation of staff time and effort is appropriate and includes all deliverables. The proposal must also provide a commitment that named staff members will be available to work on the contract if the bid is successful. CREW encourages applications from experienced to early career researchers (ECRs) under the supervision and mentorship of experienced researchers.
3	Project costs	The estimated breakdown of project costs is realistic and inclusive of all milestones/deliverables/activities.

Award criteria

No.	Criteria	Descriptor
1	Understanding the project ask and policy background	The proposal should include an introduction which demonstrates a clear understanding of the requirements of a CREW Science Policy Fellowship, a short introduction to the research area and its policy, regulatory and/or industry context and the knowledge gap.
2	Proposed methodology	The proposal should demonstrate a high quality and workable methodology, including how the evidence will be identified, reviewed, and assessed. It should explain the suitability, robustness, and limitations of the proposed methodology.
3	Milestones	The project milestones are logical, practical and show a clear pathway to achieving all deliverables.
4	Project Management	The staff, resources and expertise are appropriate for conducting the proposed project. The proposal should name the project lead and outline their project management experience.
5	General and specific topic expertise and experience	The proposal should provide details of individual staff members who will work on this Science Policy Fellowship and demonstrate how they will meet the project requirements, specifically: <ul style="list-style-type: none"> - general research experience and expertise; - specific experience and expertise on the topic of chosen topic.
6	General communication and deliverables	The proposal should describe the approach to producing the deliverables, which will be published on the CREW website. It should detail who will take lead responsibility for report-writing and overall report quality. It should provide examples of previously published reports in which they have been involved.
7	Quality assurance	The proposal should provide details of quality assurance procedures to demonstrate how the contract will be continuously delivered to a high standard. It should specifically address issues of quality control at different stages of the project, including evidence gathering, analysis and report writing. It should include a timetable for delivery of tasks, project milestones and allocation of staff and staff time against each task, covering the duration of the contract.
8	Risk	The proposal should provide a risk assessment matrix detailing any risks identified in relation to the delivery of this contract, and proposed mitigation measures to minimise their probability and impact, focused particularly on risk to completion on time.