

The Global Challenges Research Fund Science for Weather Information and Techniques (SWIFT)
Programme

SWIFT Post-Doctoral Fellowships

CALL FOR APPLICATIONS

African weather/climate researchers and applied scientists are invited to apply for fellowships in African weather information science. The fellowships are offered as part of the [Science for Weather Information and Forecasting Techniques](#) (SWIFT) Programme, led by the National Centre for Atmospheric Science (NCAS) and funded by the Global Challenges Research Fund (GCRF). The SWIFT aim is to develop a sustainable research capability in tropical weather forecasting, which will enhance the livelihoods of African populations and improve the economies of African countries.

This Call for Applications is extended to postdoctoral¹ early career researchers² working in weather/climate research and applied social and natural scientists working in the fields of African weather systems. Fellows may apply to work with a SWIFT partner organisation in Senegal, Nigeria, Ghana, Niger or Kenya.

Fellowships must be between 12 and 24 months in duration.

SWIFT fellows will be paid at a salary rate as detailed in the Appendix to this Call, depending on the country within which they will carry out their fellowship. Salaries have been calculated from the base salary of a UK post-doctoral research position, with a country-specific coefficient³ applied to each partner country to take into account the price level of consumer goods within each country. Fellows may also apply for a travel allowance to support their work in Africa and for secondments to a UK SWIFT partner organisation. Guidance on costing the fellowship is provided in the Fellowship Proposal Form document. Between three and six fellowships will be awarded within this first round. The start and end dates of the fellowship are flexible within the following constraints: fellowships should begin between 1st July and 31st December 2018; fellowships must end no later than 30th September 2021; fellowships may be carried out as a split appointment, but must be carried out within the specified timeframe⁴.

Fellowship applications must be aligned with a SWIFT research theme (listed in the Appendix of this document). We aim to give priority to support at least one proposal aligned with the SWIFT research theme: *User needs, co-production and communication*.

¹ Candidates must have a PhD degree, with experience in a discipline related to the SWIFT research themes (e.g. physics, meteorology, environmental social science or related area), or expect to be awarded a PhD degree before the start of the proposed fellowship.

² Early career researchers (ECRs) are defined as individuals within eight years of the award of their PhD or equivalent professional training, or an individual who is within six years of their first academic appointment. These durations exclude any period of career break, e.g. family care or for health reasons. The 'first academic appointment' is defined as the first paid contract of employment, either full-time or part-time, which lists research and/or teaching as the primary functions.

³ Country correction coefficients have been taken from the European Commission's Eurostat Remuneration data: <http://ec.europa.eu/eurostat/web/civil-servants-remuneration/correction-coefficients>

⁴ For example, a fellowship 12 months in duration may be carried out in two halves (i.e. 6 months each), with the fellow returning to their Home Institute for a period of time after carrying out the first half of their fellowship, before completing the remaining 6 months of the fellowship at the Host Institute.

Applicants must be of Sub-Saharan African nationality, but may be located anywhere in the world at the time of application.

The deadline for applications is midnight on Friday, 23rd March 2018. Information on how to apply can be found in Section 3 of this document. Applications will be assessed by a panel of representatives from the SWIFT Programme. We anticipate that successful candidates will be notified by Friday, 11th May 2018.

We especially encourage female applicants to apply for the SWIFT fellowship scheme. We will aim to recruit 50% female researchers in this Call for Applications.

1. Background to the SWIFT Programme

Full details of the SWIFT objectives and work plan can be found at: <https://africanswift.org/>. The top-level objectives of the SWIFT Programme are described here:

- Make research advances needed for significant improvements in weather forecasts in Africa and the tropics more generally, from the hourly to the seasonal timescale.
- Build capability among UK and African partners to improve, maintain and evaluate operational tropical forecasts in future.
- Assist African partners in developing capacity for sustained training of forecasters, in partnership with African academic institutions and international agencies.

The expected outcomes of the SWIFT Programme are:

- New research capability in observing, modelling and evaluating forecasts of tropical high-impact weather.
- Robust networks of African scientists with capability to advance the science in this field, and pull the science through into operational impact.
- Significant improvements in weather forecasts, as evaluated using tested methods.
- New forecasting tools used operationally for short-term (0-120h) and sub-seasonal to seasonal prediction.
- Significant impact on the regional strategy for provision of user-focussed, quality-controlled weather forecasts, as overseen by the WMO.
- More effective use of weather forecasts to the benefit of African people and nations.

2. Description of the SWIFT Fellowship Programme

The SWIFT Programme will award fellowship grants that will enable successful fellows to conduct research or applied project work on weather forecasting science and related social science issues. The research project will be of the fellow's own design, but must be aligned with one or more research themes as described in the Appendix to this document. These awards are intended to increase the professional development of the

fellows, to advance the programme aims of SWIFT and to increase the capacity and capability of the SWIFT African partner organisations. It is expected that the fellowships will represent the full-time occupation of the successful applicants; however, applications requesting a part-time fellowship to balance with childcare or caring responsibilities will also be considered.

The SWIFT Fellowship

The SWIFT Fellowship programme is comprised of one fellowship type: Post-Doctoral Research Fellowships. Between three and six fellowships will be awarded in this first Call for Applications. Candidates must have a PhD degree, with experience in a discipline related to the SWIFT research themes (e.g. meteorology, environmental social science or a related area), or expect to be awarded a PhD degree before the start of the proposed fellowship. Awards may be used to assist fellows gain a temporary postdoctoral position at an African institute. The research programme must have well-defined objectives and be sufficiently focussed to advance understanding on a recognised long-standing 'problem'. The fellowships will last for between 12 and 24 months. Fellowships may be split, i.e. applicants may propose to carry out half of their fellowship (between 6 and 12 months), return to their Home Institute for a period, and then carry out the remainder of their fellowship at their Host Institution. However, all fellowships must end by 30th September 2021.

Home and Host Institutes, Visiting Fellowships

Successful candidates must conduct their research or project work at a SWIFT partner institute based in Africa. Details on SWIFT partner organisations can be found [here](#). Applications from fellows already registered or appointed to a SWIFT African partner organisation are welcomed; however, please note that fellows are expected to move to a new Host Institute in order to carry out their fellowship (i.e. fellows should not already be registered or appointed at their nominated Host Institute and will be a Visiting Fellow of their nominated Host Institute)⁵. Visiting Fellowships must be arranged by, and agreed between, the Home and Host Institutes in advance of submission of the application.

3. How to Apply

The following documents must be submitted to the SWIFT Programme Manager before midnight on Friday, 23rd March 2018:

1. Fellowship Proposal
2. Copy of BSc and PhD certificate (if already awarded)
3. Two documents (either published papers or thesis chapters) demonstrating the candidate's ability to produce and publish scientific research
4. Host Institute Endorsement Form (to be submitted by the Host Institute)
5. Home Institute Endorsement Form (to be submitted by the Home Institute)
6. Two professional reference forms (to be submitted by the referees)

All document templates required for application can be downloaded from the SWIFT Programme website: www.africanswift.org/swift-fellowships

⁵ In exceptional circumstances, where fellows are unable to move to a new Host Institute to carry out their fellowships (for example, due to family commitments such as caring or childcare responsibilities), the Home Institute may also act as the Host Institute. In the case that the fellowship is to be conducted at the Home Institute, the Home Institute is also the Host Institute for purposes of the application (and both Endorsement Forms (see section 3) must be submitted by the Home Institute). Note also that if the fellowship is to be conducted at the Home Institute, a clear gap in existing funding to support the proposed research/project must be demonstrated.

Candidates should write the Fellowship Proposal in liaison with the Host Institute. The Fellowship Proposal should not be submitted without approval of the Host and Home Institutes.

It is the responsibility of the applicant to coordinate all submissions and to ensure all required documents are completed and submitted by the application deadline. All completed documents should be submitted by email and attachment to the SWIFT Programme Manager, Dr Lorraine Youds, at lorraine.youds@ncas.ac.uk no later than midnight on Friday, 23rd March 2018.

4. Evaluation of Applications

All applications will be evaluated by the GCRF African SWIFT Fellowship assessment panel. All applicants must meet the following general eligibility criteria.

All applicants must:

1. Be a national of a Sub-Saharan African country.

In addition:

2. All required application documents (Section 3) must be received on or before the application deadline;
3. Applications must be endorsed by the Host Institute and Home Institute;
4. The total budget (including salary, research costs, conferences attended, travel costs and institutional overheads) must not exceed £33,830 per year (please adjust this amount pro-rata if your fellowship is to be longer than 12 months in duration). The panel will make a decision regarding the appropriateness of the budget applied for under each of the above categories and an explanation and justification of these amounts must be provided.

The applicant must also satisfy the essential qualifications and skills, as listed below. The candidate must provide full evidence in the relevant section of the Fellowship Proposal.

Essential qualifications and skills:

- a) A PhD degree in a relevant field (or expect to be awarded a PhD before the start of the proposed fellowship).
- b) A strong understanding of the SWIFT research theme selected for study.
- c) A good working knowledge of spoken and written English.

In addition to assessment of the Fellowship Proposal and the candidate attributes, the assessment panel will also give consideration to the following:

- the appropriateness of the cost and purpose of budgeted items;
- the resources of the Host Institute;
- that fellowships awarded achieve good coverage over the SWIFT research themes, with a priority given for the User needs, co-production and communication research theme;
- that candidates have demonstrable ability to research and/or publish scientific research internationally; and
- that fellowships awarded achieve good coverage across SWIFT African partners.

Candidates may submit separate applications for different themes (separate application forms must be used), but a maximum of one fellowship will be awarded to each successful candidate. Host Institutes may endorse applications from more than one candidate.

5. Financial Support

Salary levels for the SWIFT Fellowships are provided in the Appendix of this document. Salaries have been calculated from the base salary of a UK post-doctoral research position, with a country-specific coefficient⁶ applied to each partner country to take into account the price level of consumer goods within each country. Salaries must cover costs related to accommodation and subsistence for the fellows in relocating to undertake their position at the SWIFT partner organisation.

In addition to the salary provided by the fellowship award, fellows may also apply for financial support for the following (details provided in the Budget section of the Fellowship Proposal Form):

- Costs to the host institute
- International/national travel and accommodation
- Additional research costs

Applicants are required to provide an itemised breakdown of all costs in the budget section of their proposal.

6. Support Available from the GCRF African SWIFT Programme

The successful fellows will have access to the GCRF African SWIFT Programme intranet and web forums, providing an opportunity to discuss work with other academics and researchers working as part of the SWIFT Programme.

Each successful fellow will be assigned a mentor team for the duration of their fellowship. The mentor team will include an African mentor from the Host organisation and a UK partner institution mentor, both of whom will be expert in the fellow's chosen field of study. Applicants may wish to identify a mentor at this stage, though this is not a requirement of the application process (if a mentor has been selected, please provide detail in the Host Institute Endorsement Form). Please note, however, that a Host Institution from the SWIFT partner team, based in an African country, must be identified. We will ensure that successful female applicants are assigned at least one female mentor from the SWIFT team. Mentors will review progress reports and the final technical report submitted by fellows.

7. Contact Information

For more information on the Call for Applications, please contact the African SWIFT Programme Manager, Dr Lorraine Youds (lorraine.youds@ncas.ac.uk).

Please note that female applicants may request support on submitting their application from SWIFT Programme Manager, Dr Lorraine Youds (lorraine.youds@ncas.ac.uk) and/or, SWIFT collaborator Dr Mariane

⁶ Country correction coefficients have been taken from the European Commission's Eurostat Remuneration data: <http://ec.europa.eu/eurostat/web/civil-servants-remuneration/correction-coefficients>

Diop Kane, Director of Meteorology at the Agence Nationale de L'Aviation Civile et de la Meteorologie (ANACIM) (mariane.diopkane@anacim.sn).

APPENDIX

SWIFT RESEARCH THEMES

All SWIFT Fellowships should be developed with a SWIFT research theme in mind. Projects aligned with the SWIFT theme: User needs, co-production and communication, will be given priority. Candidates must nominate one theme which best describes the main focus of their research proposal and ensure alignment with the named theme. More detail on the SWIFT research themes can be found below. **Note that the proposed research projects may include work across more than one theme.**

Candidates may contact the SWIFT Programme Manager, Dr Lorraine Youds (lorraine.youds@ncas.ac.uk) for more information of the SWIFT Programme and research themes.

SWIFT Research Theme 1: User needs, co-production and communication. Active engagement and co-production between users and providers of meteorological information is needed for seasonal and sub-seasonal forecasts to meet the needs of users. Recognition of this challenge underpins initiatives such as the [DFID-Met Office's WISER programme](#). However, insight is urgently needed into how users' interpretation and utilisation of forecast information changes across timescales. Meeting this challenge, we will examine user needs at nowcasting to seasonal timescales, addressing questions such as how users understand and respond to the updating of forecasts over time, and how the changing nature of uncertainty at different lead-times can be effectively communicated. The research objectives of this theme are to:

- O1.1 Provide a stakeholder analysis (forecast users and providers) across all levels of decision-making (local, district, national, international) in each SWIFT partner country (Senegal, Nigeria, Ghana and Kenya).
- O1.2 Identify who users of meteorological information are and which weather events have greatest impact on agricultural and water management.
- O1.3 Identify and collate examples of best practice and evaluate their economic benefits and assess the potential impact of improved meteorological forecast information on farming practices and water resource decision-making.
- O1.4 Identify communication pathways, procedures and early warning systems in operation between users and forecast agencies across different levels.

SWIFT Research Theme 2: Forecast evaluation. The value of a forecast can be measured by a metric relevant to the user – but is eventually determined by the user uptake of these forecasts. The new forecasting systems proposed in this programme are becoming established tools in the UK, but their applicability and skill in forecasting tropical convection is untested. Existing diagnostic tools to evaluate these forecasts are developed for regions with dense data networks and where the scientific understanding of synoptic meteorology is mature. It is no foregone conclusion that these forecasting systems and their associated evaluation and verification metrics can be translated to tropical convection, and the potential to evaluate forecasts of convective storm characteristics using satellite data is unfulfilled. At longer lead-times, forecasts become probabilistic and systematic biases develop on these time scales. Our challenge is to increase confidence in forecasting methods, developing a seamless evaluation methodology across time scales,

establishing best practice and enabling local capability in Africa. Increased confidence will improve uptake of forecasts for planning, decision-making and disaster mitigation. The research objectives of this theme are to:

- O2.1 Determine the best forecast evaluation metrics for data-sparse regions in the tropics.
- O2.2 Improve capability in forecast evaluation for operational services in Africa.
- O2.3 Assess forecast uncertainty at all time scales considered for different weather regimes developing a seamless evaluation methodology.

SWIFT Research Theme 3: Satellite remote sensing. Satellite data are crucial for improving the accuracy of weather forecasts on time-scales of a few hours (nowcasts) to seasonal timescales, particularly in regions where radar data are generally unavailable. The UK atmospheric science community lacks expertise in this important area that is required for weather prediction in Africa and other parts of the developing world, and can contribute to early-warning systems as well as crisis relief. Our challenge is to build capability in both the UK and Africa in innovative use of satellite data for tropical prediction and research. The research objectives of this theme are to:

- O3.1 Establish UK capability in advanced satellite remote sensing of tropical clouds, especially deep convection, and increase African capability in this area.
- O3.2 Develop new tools for satellite data analysis which can be used operationally for forecasts on scales from 0 hours to 60 days.

SWIFT Research Theme 4: Nowcasting methods (0-6h). African society is severely impacted by severe storms that produce heavy rain, high winds, hail and lightning. Mobile weather alerts based on short-term 'nowcasting' have been effective for communicating severe weather alerts to users in certain areas, e.g. Lake Victoria for fishermen. Experience in the USA shows that a combination of storm tracking with NWP will provide more sophisticated alerts. Despite the lack of radars, the regular occurrence of large persistent systems means that satellite-based nowcasting will add real value in Africa. Working within the framework of WMO coordination, the challenge is to review and implement short-term forecasting and visualisation tools, and develop new nowcasting innovations. The research objectives of this theme are to:

- O4.1 Provide the new knowledge of controls on storm initiation, movement, growth and decay needed to develop effective nowcasting tools for West and East Africa.
- O4.2 Provide an evaluated automated product combining satellite observations with NWP model data for nowcasting convection, and train African scientists in its use and development.

SWIFT Research Theme 5: Synoptic methods, 0-120h. Synoptic meteorology is the key forecast timescale for responding to high-impact weather (HIW) events (storms, floods, etc.). Synoptic systems are active in West Africa, but the challenge is to determine the control of HIW by the synoptic systems: West Africa is the ideal location for systematically investigating the capability of state-of-the-art convective-scale ensemble predictions. In East Africa the synoptic conceptual models are less well developed than in West Africa and the challenge is to work with climate statistics and case studies to establish conceptual models for the synoptic meteorology. The research objectives of this theme are to:

- O5.1 Use the convective-scale and lower-resolution ensemble simulations to determine the predictability of deep convection in different synoptic environments in West Africa.
- O5.2 Develop new conceptual models for East Africa, and objective measures of their dynamical components, which can be used for forecaster training and communication with users.

SWIFT Research Theme 6: Sub-seasonal to Seasonal (S2S) Prediction. Despite the chaotic nature of tropical weather on daily timescales, there are sources of predictability on S2S timescales including the Madden-Julian Oscillation; equatorial trapped waves; and long lived soil moisture and vegetation anomalies. Skillful forecasts on these timescales have the potential to inform decision making and early warning in agriculture and other sectors. Our challenge is to advance these theoretical ideas to achieve a useful forecast tool. Due to the number of drivers of intra-seasonal variability and the non-linear response to these drivers, the skill of operational forecast systems may be regime dependent. Understanding the regime dependence of this skill allows forecasters and forecast users to make better judgements about their confidence in a particular forecast. The research objectives of this theme are to:

- O6.1 Identify sources of predictability for African rainfall on sub-seasonal timescales and assess the skill of operational S2S prediction systems.
- O6.2 Build research capability in the UK and Africa to inform the development of operational forecast products on the sub-seasonal timescale for decision making across a range of sectors.

SWIFT Research Theme 7: Convection-permitting (CP) ensemble forecasting. Previous research ([CASCADE](#)) has demonstrated significant added-value in CP weather forecasts (i.e. those run at sufficiently high resolution to simulate tropical storms) over traditional global numerical weather prediction (NWP) forecasts, especially when applied to high-impact weather such as extreme rainfall or localised drought. CP forecasting systems are now operational over a number of tropical regions such as East Africa and Singapore and show fundamental improvements, such as the ability to predict the severe and devastating storms that occur over Lake Victoria. An ensemble forecast system, which identifies the uncertainty or potential 'spread' in weather forecasts has been operational over the UK for a number of years, but has not yet been utilised in the tropics, where the benefits to the African public and organisations in terms of HIW forecasts could be even larger. Our challenge is to implement and test a state-of-the-art high-resolution CP ensemble of Africa, and determine the best strategy for future use of ensembles in forecasting. The research objectives of this theme are to:

- O7.1 Determine the key components of a CP ensemble forecast system necessary to produce skilful and useful forecasts in the tropics.
- O7.2 Demonstrate the added value of the system over global NWP forecasts or a single (deterministic) convection-permitting forecast for regions of West and East Africa.
- O7.3 Determine how weather predictability in the ensemble forecast system varies under different larger-scale (synoptic) atmospheric conditions, such as African Easterly Wave events.

NATIONAL-LEVEL SALARY INFORMATION

The salaries for fellowships in each SWIFT host country should be specified within your budget breakdown (in the Proposal Form) as detailed in the following table:

Country	Per Annum	Per Month
Ghana	£18,839.71	£1,569.98
Kenya	£16,204.64	£1,350.39
Niger	£17,594.80	£1,466.23
Nigeria	£16,204.64	£1,350.39
Senegal	£20,956.07	£1,746.34