**Job Description**

**1. Job Details**

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| Job Title:  | PDRA in eDNA-based Environmental Impact Monitoring | Job Family | Science |
| Line Manager: | PI in Benthic Ecology  | Grade range | 5 - 6 |
| Full Time/Part Time | Full Time  | Duration of appointment | Approximately 2.5 – 3 years  |

**2. Job Purpose**

* Develop and optimise machine learning algorithms that predict environmental status from metabarcode data.
* Iteratively test/update this algorithm against incoming data.
* Wrap the code into an easily communicable package, make available to external users (industry and regulators) and publish in high-ranking peer-reviewed journals.

**3. Main Responsibilities**

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| *Role Description* | *Approx. %**of time* |
| Run bioinformatic software scripts (e.g. Qiime2) to process and annotate metabarcode data (MiSeq/HiSeq fastq files)  | 5 |
| Develop machine-learning code in R (e.g. random forests, RF) and evaluate accuracy/precision on existing and new data sets  | 15 |
| Investigate and evaluate new methods for dimension reduction, assess data pre-processing options on RF prediction accuracy. Iteratively develop the code and data, in liaison with partners, via GitHub or other suitable platform. Develop an R-package to contain the code (and publish) | 35 |
| Publish the methods/protocols/results in high impact peer-reviewed journals/literature – appx 1-2 papers per annum | 15 |
| Develop collaborations, identify and pursue additional sources of funding  | 10 |
| Develop and deliver training to the user community, face-to-face, via documentation and videos  | 10 |
| Where possible, link your expertise to SAMS Enterprise activities. | 5 |
| Where opportunities arise, contribute to SAMS Education portfolio – teaching/training/supervising students, CPD activities. | 5 |
| Be pro-active in the application of SAMS Health and Safety Procedures | Ongoing |

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**4. Planning and Organising**

This rolewill require you to lead, with the PI, partner liaison (academic, industry and regulators) to plan and agree all aspects of the project. This will include: agreeing with partners a standardised data reporting methodology, liaise regarding deadlines, directing sampling and sample analysis prioritisation, and leading the planning and delivery of training to partners and roll-out of the code.

Your plan will optimise workflows in relation to data arrival, data processing and reporting, including leading on peer-reviewed publications. You will lead/contribute to proposal writing to develop and extend the project and related projects and this will include assessments of commercial opportunities.

With the PI, you will seek opportunities for external collaboration (nationally and internationally) to share data and protocols. You will identify the self-contained elements of the project (sampling prioritisation, algorithm development and testing, reporting etc) and enable efficient working on any of these as time and resources allow, managing your day/week programme with little supervision. You will be able to ‘step-back’ from the academic detail and ensure (with the PI) that the core-project deliverables will be met on schedule.

**5. Problem-Solving**

* You will work with the PI to address the challenges posed by the datasets, leading the development of the algorithm in terms of flexibility, stability and accuracy (e.g. in predicting benthic status from metabarcode data).
* You will liaise with partners on optimising the approach for the intended application, including how to demonstrate where the approach works well, and less well, and suggest mitigative measures where appropriate.
* You will work with the PI on related proposals and contribute to PhD supervision where appropriate and
* Seek and develop new funding avenues or other opportunities to augment to existing sampling efforts.

**6. Decision-Making**

* You will evaluate different solutions to the data management/processing/ML problem and, liaising with the PI, find solutions.
* You will lead discussion (with the PI) on these challenges and liaise sensitively with the partners.
* You will lead on data protocols and dissemination strategies.
* You will find and lead collaborative opportunities that benefit the project, and the project area more widely.
* Identify and pursue relevant funding streams.

**7. Key Contacts/Relationships**

Within SAMS, your key contact will be the SAMS PI, and the wider SAMS programming/bioinformatics/genomics group. Externally, you will also liaise across all partners (industry, regulatory, academic) to lead the project delivery. The role will require liaising with our IT department regarding data management (storage) and server-based processing. You will also represent the project at national/international conferences and meetings. You will need to be aware of the sensitivities around aquaculture in Scotland and also globally.

**8. Knowledge, Skills and Experience needed for the Job**

You will have:

* A PhD in a relevant subject area e.g. in ecology with statistical modelling/bioinformatics or in statistical modelling with an ecological application.
* Experience in statistical modelling: univariate, multivariate, machine learning, dimension reduction, graphical exploration, statistical inference, experimental design.
* Competancy in data ‘wrangling’: development of data-processing pipelines to include error checking (of ‘user’ supplied data), manipulating large data sets, joining/merging data, random forests (and alternatives).
* Programming in R: writing and annotating functions, ideally in building R-packages. Knowledge of web-interfaces (e.g., Shiny) would be an advantage.
* Ability to produce accessible, thoroughly annotated, flexible, adaptable code that can be communicated to the non-specialist user community.
* An ability to report your results, both to the user community and via peer-reviewed publications.
* A knowledge of metabarcoding, Qiime2 software and BASH would be an advantage as would an understanding of benthic and/or microbial ecology.
* Experience of working within industry and regulators would be an advantage.
* A willingness to travel, nationally and internationally, to provide training and/or dissemination.
* A track-record in proposal writing.

**9. Dimensions – Scope of role**

* Working with the PI, you will need to lead the delivery of the technical aspects of the BactMetBar project. This will involve familiarisation with aquaculture/ecology, and the existing code (written by the PI).
* You will lead research, with the PI, on how to improve the approach and then publish and disseminate this and incorporate the improvements into the revised code/protocols. You will lead on the prioritisation of sampling and sample analysis.
* You will take a leading role in reporting progress, challenges, and opportunities to our partners via written updates, online and during face-to-face meetings.
* You will liaise with partners and sequencing facilities regarding sequence data (for example during quality assessment) and in the provision (by industry) of accurate, reliable metadata.
* You will assist SAMS in achieving a high scientific profile through research, teaching and networking activities and be prepared to travel abroad (e.g. to conferences/ meetings) and willing to support the PI in promoting the project.

**10. Any other relevant information**

There are opportunities for fieldwork (e.g. local sample collection), teaching in Marine Science and mentoring (e.g. PhD students). The post holder may be required to perform duties other than those given in the job description for the post. The particular duties and responsibilities attached to posts may vary from time to time without changing the general character of the duties or the level of responsibilities entailed.

SAMS working practices consist of flexible working arrangements that allow staff to work on-site three days per week, and work remotely the remaining two days per week. We are open to discussing alternative working arrangements, and these will be reviewed on a case-by-case basis, especially for new employees who are relocating to the area dependant on the job and its requirement for field-based activities.

**11. Relevant publications**

* Dully, V., G. Rech, T. A. Wilding, A. Lanzen, K. MacKichan, I. Berrill and T. Stoeck (2021). "Comparing sediment preservation methods for genomic biomonitoring of coastal marine ecosystems." Mar Pollut Bull 173(Pt B): 113129.
* Dully, V., T. A. Wilding, T. Mühlhaus and T. Stoeck (2021). "Identifying the minimum amplicon sequence depth to adequately predict classes in eDNA-based marine biomonitoring using supervised machine learning." Computational and Structural Biotechnology Journal 19: 2256-2268.
* Forster, D., G. Lentendu, S. Filker, E. Dubois, T. A. Wilding and T. Stoeck (2019). "Improving eDNA-based protist diversity assessments using networks of amplicon sequence variants." Environ Microbiol 21(11): 4109-4124.
* Frühe, L., T. Cordier, V. Dully, H.-W. Breiner, G. Lentendu, J. Pawlowski, C. Martins, T. A. Wilding and T. Stoeck (2020). "Supervised machine learning is superior to indicator value inference in monitoring the environmental impacts of salmon aquaculture using eDNA metabarcodes." Molecular Ecology DOI: 10.1111/mec.15434
* Frühe, L., V. Dully, D. Forster, N. B. Keeley, O. Laroche, X. Pochon, S. Robinson, T. A. Wilding and T. Stoeck (2021). "Global Trends of Benthic Bacterial Diversity and Community Composition Along Organic Enrichment Gradients of Salmon Farms." Frontiers in Microbiology 12(853).
* Lejzerowicz, F., P. Esling, L. Pillet, T. A. Wilding, K. D. Black and J. Pawlowski (2015). "High-throughput sequencing and morphology perform equally well for benthic monitoring of marine ecosystems." Sci Rep 5: 13932.
* Pawlowski, J., P. Esling, F. Lejzerowicz, T. Cedhagen and T. A. Wilding (2014). "Environmental monitoring through protist next-generation sequencing metabarcoding: assessing the impact of fish farming on benthic foraminifera communities." Molecular Ecology Resources 14(6): 1129 - 1140.

[WHAT SAMS CAN OFFER YOU (please right click and select open in new tab)](https://sway.office.com/7GSAUexj0DJC3tZz?ref=Link)

Our Values and culture

We strive to be a world-class marine science enterprise that underpins regional, national, and international policy, and societal action to secure healthy and sustainable oceans.

As a workforce, we have a strong family and team culture, helping each other to achieve our goals.

Remuneration

We offer a generous salary and pension as well as employee benefits package. We also have a number of supportive policies to assist absence, family, and other leave types.

Employee Benefits

In addition to a general remuneration package which includes a generous salary, pension, and sickness absence policy, we offer a number of employee benefits to our staff, some of which are listed below:

* Flexible working arrangements
* Purchase of additional annual leave – up to 20 days per annum
* Access to shopping discounts as well as local shop and leisure discounted memberships
* Cycle to work scheme
* Purchase of technology
* Payroll Giving
* Salary Sacrifice – pensions
* Access to wellbeing portals which provide support for mental health, nutrition and fitness and GP referral scheme
* Occupational health support
* Welfare support on site
* Access to free CBT sessions
* Sabbatical scheme
* A number of training and development courses to assist you with your career development – leadership, coaching and mentoring.

Conditions of Service

The position is full time, fixed term for up to 2.5 years and based on-site near Oban. The post sits in our Science department at Grade 5-6. The salary range for the role is £32,344 - £36,382 per annum (*starting salary will depend on the depth of relevant experience you bring to the role).*

Applications from outside the UK are welcomed; however, this role will not be available for sponsorship. Candidates must therefore have the rights to work in the UK.

We have a range of initiatives to support a family friendly working environment. Please contact us if you would like further information on these.

SAMS is part of the University of the Highlands & Islands and holds an Athena SWAN Bronze award. SAMS is currently working towards a silver award.

As an Academic Partner of UHI, SAMS is designated as an educational establishment and subject to the provisions of the Protection of Children (Scotland) Act. Certain roles may be subject to a satisfactory check by Disclosure (Scotland) as a condition of their appointment.

Further information about the role can be found at [www.sams.ac.uk/vacancies](http://www.sams.ac.uk/vacancies)

Applications must include CV and Cover Letter and should be sent electronically to recruitment@sams.ac.uk quoting Job Ref. ‘D05/22.TW’ in the subject line.

The closing date for applications **12th July 2022**

**Interviews will be held in July**

*Please note, we prefer to contact referees prior to interview*

Guidance for Applicants

There is a competitive market out there and it is important when applying for opportunities to provide as much information to your recruitment panel as possible. Remember, this is your opportunity to impress a recruitment panel. The panel members only get to know about your qualifications, skills and experience the moment they read your application (cover letter and CV) and if you don’t document everything required, then this will lessen your chance of reaching our short list.

Below we have provided some guidance, tips, and advice to help you provide the best application you can when applying for our positions.

***Cover letter***

Please remember to include a cover letter with your application. This is an important part of the application process. In the letter, connect your past accomplishments with the requirements listed in the job description. Focus on your most relevant experience, qualifications, and skills. Where possible, quantify your accomplishments with facts and data.

Avoid repeating the bullet points from your resume.

Please include in your cover letter:

* Why you are applying for this role
* Where you found out about the position
* Specific examples of how you meet the job criteria

***CV***

* Your CV should include all your relevant work experience, listed with the most recent first.
* You should also include your educational achievements with you most recent qualification first.
* You should include skills and competencies gained from previous employment or education. This should be specific to the job description.
* Please include details of two referees who we may contact if invited for interview.

 ***Useful links***

* [How to write a flawless cover letter](https://career-advice.jobs.ac.uk/cv-and-cover-letter-advice/how-to-write-a-flawless-cover-letter-in-2020/) (please right click and select open in new tab)
* [How to write a CV](https://www.reed.co.uk/career-advice/how-to-write-a-cv/) (please right click and select open in new tab)