Software Sustainability Institute Status Report

Covering the period from

1 April 2014 – 15 August 2014

Prepared by:
Giacomo Peru, *Project Officer*
Neil Chue Hong, *Director*
Steve Crouch, *Research Software Lead*
Simon Hettrick, *Deputy Director and Policy & Communications Lead*
Aleksandra Pawlik, *Training Lead*
Shoaib Sufi, *Community Lead*

Overview

The Software Sustainability Institute entered its fifth year continuing the initiatives from 2013 as well as undertaking new activities. The Research Software Engineer campaign has grown in momentum and traiing activities encompass both Software Carpentry and doctoral training.

The four teams remain the same, however consultancy has been renamed "research software" after consultation with the community:
- Community (led by Shoaib Sufi)
- Research Software (led by Steve Crouch)
- Policy and Communications (led by Simon Hettrick)
- Training (led by Aleksandra Pawlik)

No new staff were hired during this period, but Aleksandra Nenandic will be joining the Community theme at Manchester in September to replace effort provided by Aleksandra Pawlik which is now supporting ELIXIR-UK training activities. Staff at Oxford, including Iain Emsley, will support Policy initiatives and events from September. John Robinson will assist Steve Crouch as Deputy Lead for the Research Software team.

The approximate staffing for each of the teams over the reporting period is:
- Community: 1.75 FTE
- Consultancy: 4 FTE
- Policy and Communications: 2.5 FTE
- Training: 1.75 FTE

of which 9.5 FTE is funded by the core EPSRC grant, and 1 FTE is funded by other grants.

Significant highlights in the last five months include:
- IP, Copyright, Licensing and Commercialisation workshop organisation well underway
- Several Software for the Future 2 proposals submitted based on Open Call collaborations
- The RSE campaign was featured in Research Fortnight, the AGM/Hackday has attracted sponsorship from Maudlsey Digital, Microsoft Research and interest from Google and Amazon.
- Software Carpentry continues to grow and members of the Institute have been invited to join the boards of both Software Carpentry and Data Carpentry.
- We continue to promote the UK's thought leadership on software sustainability to international audiences

Changes from revised plan

There are no significant changes from the staffing organisation and fellows programme presented at the Advisory Board in February 2013.

Community

Highlights

- The existing Fellows are steadily fostering the position of the Institute as a beacon for the community it serves by creating an energetic network of long-term collaborations and ambassadors for the Institute's activity

- The Fellowship Programme 2015 has been launched. The new programme incorporates feedback from existing and past Fellows

- Very positive follow-up to CW14

- Theme for CW15: Effective interdisciplinary working

- Registrations are open for IPCLC, which will be on 11 December 2014. Keynote speeches by representatives of Oxford Research Services (Phil Clare) and of qLegal (Patrick Cahill)

- Aleksandra Pawlik's involvement in the team has come to an end and she will be substituted from September 2014 by Aleksandra Nenadic

Fellows

We have had a closer collaboration with certain Fellows in this period. In particular, Leanne Wake has adopted the advice given to her by the Institute at the CW14 and in private calls with Community and Consultancy teams to formulate a plan for how she can build a community resource for sea level rise data which is well architected, acknowledges and includes the need for research software engineers, and also has in-built mechanisms for clear attribution of credit.

Fellow Mark Basham invited us on a Software for the Future II proposal. Mark also works with the Institute's Research Software Group (RSG, formerly known as Consultancy) on the DAWN Science initiative and although this proposal did not go forward it is a strong sign that the Fellowship Programme and other community engagement are encouraging others to work more closely with us; it is expected that the material from the draft proposal will form the basis for a future H2020 bid. Melody Sandells (Fellows 2013) has also expressed an interest in including us in a future grant proposal.

Two Fellows, Derek Groen and Liberty Foreman, have each planned workshops that combine interdisciplinary working with strong results for those taking part. Derek's 2020 Science

paper-athon brings together EPSRC 2020 Science Fellows and developers with the aim of producing a paper after 3 days. Liberty Foreman's workshop brings together clinical fellows with data analysts who can help them analyse their data and turn them into meaningful results – a win-win for all involved. We believe these type of innovative workshop should be promoted by the Institute and we will encourage the presentation of process and results at the CW15. Once these workshops are complete we will work with these Fellows to create a guide for those seeking to run similar events. In addition Liberty had a pre-workshop meeting to help scope out the requirements which we think are an excellent step in terms of determining a market / need for the training [A:18].

We were asked by Ian Gent's team (a colleague of Fellow Alexander Konovalov) to take part in their summer school. Both the director Neil Chue Hong and the Lead of Consultancy (Steve Crouch) took part and presented at the event. This multi-faceted engagement helps us get to know other teams and is fertile soil for future collaborations. In addition, Fellow Tom Crick is co-organising the Recomputability Workshop from 8-11 December 2014 with Neil Chue Hong. A thread of us working with Fellows and others to work on larger and larger joint-ventures where there is mutual gain is developing.

We were asked by Fellow Robin Wilson (April 2014) to act as a reference for his application for a lectureship position. We believe this is a good sign of how we are helping the community and also a sign that we are establishing long term collaborations.

We have received continuous interest in the Fellowship Programme in the lead up to the launch of Fellows 2015 from as far afield as Australia. In the Australian case we directed them in the direction of http://archer.edu.au.

Some existing Fellows 2013 have enquired about using their finances beyond the usual time frame (15 months) and so we have taken a flexible approach to this: e.g. Alex Chartier used some of his remaining funds to attend additional workshops and conferences; James Hetherington's remaining Fellowship funds were used to help support the upcoming Research Software Engineer AGM in September. We are taking this forward on a case by case basis as applicable.

One of the things we do is to occasionally ask the Fellows their opinion, either because they are representative of the research community that we serve or because we intend to trial questions with them before we take them to a wider audience. Amongst some of the questions that we asked were:

- We asked them to estimate how many people they talk to on an average day at a conference (not during poster or presentation sessions, but at coffee, lunch, dinner, etc.); this helps us determine the number of people who learn about the Institute from talking to Fellows at a conference. A sample of Fellows responded to our question and the average was 8 people. Please see reference A:36 for the data.

- We asked the Fellows who is their funder, as it is important to be able to report to the funding agencies – we found an amazing discrepancy between who we thought funded people and who actually funded them: for instance some PhD students turned out to be self-funded. This will be something we will ask when recruiting Fellows 2015 and attendees at Conferences (e.g. IPCLC and CW15).

On the subject of promotion, Fellow Stephen Eglen was happy to promote the messages of the Institute at the Welcome Trust 'software sharing focus group' that he was invited to attend, quoting:

> 'I declared an interest during the meeting when they mentioned the SSI, given that I am a fellow, but I think they already value the work you do. I reiterated the importance of the SSI, and in particular suggested that the bootcamps were a great way of introducing life-scientists to modern computing methods. I suggested they might want to sponsor a couple of workshops a year for WT-funded researchers, to which they seemed to nod in agreement...'

We think it's excellent that Fellows feel empowered to do this and of course there are benefits for the Institute. It's interesting to note that Fellows can speak to others of aspects of the Institute they know of or have been involved with.

We had a successful Fellows mid-year meeting [A:9] which was attended by 9 of this year 2014 Fellows, where we discussed the topic of reproducible research in their domains with an aim of helping concretise their plans for engagement with their domains. In summary they needed both to engage with their domains and training on how to do this better. One of the fruits of this was Fellow Leanne Wake's targeting of publishers in her domain and getting them to think about reproducible research and their approach to software and data publishing alongside papers to help reproduce computation results. She is planning a Town Hall meeting at the Annual Geophysical Union meeting specifically targeting publishers. The AGU is a huge meeting attracting over 25,000 attendees in the Earth Systems Science space. Last year we held a Town Hall meeting jointly organized by three of the Fellows 2013 and ourselves in the space of sustainable software practice; it is excellent to have continued representation by us at this event.

Fellows were also able to give ideas on how to improve the Fellowship Programme in 2015. One of the key things they said was to have a startup meeting for the Fellows before the CW15 (this could even be virtual) where as well as getting an introduction to the Institute and its themes, they would be told about promotional material for the Institute, e.g. digital and physical, and that they are free to promote at **any** events they attend, not just the Institute sponsored ones. Also, some said they would have written event reports / blogs from conferences and events not supported by the Institute which they were attending anyway and this would be another way for the Institute to get good information and content. These improvements will be added to the Fellowship Programme 2015.

Fellows were given a boost of promotional material at the mid-year meeting (stickers and flyer); Fellow Mark Basham actually arranged the printing of his own high quality stickers and Fellows Robyn Grant and Farah Ahmed, who were not able to attend, have requested material for the workshops they are arranging that are supported by the Institute.

Continuing Fellows (those not in their initial inauguration year) continue to engage. We supported Fellow Melody Sandells MICROSNOW workshop gaining us extra exposure [A:5].

Day in the Software Life (DISL)

This is a series run by Policy and Communications but is naturally very close to a Community Activity, so from May 2014 onwards we are reporting it in the Community Update.

DISL is about how software is helping researchers get their research done. Leads are examined from University news pages, contact is made with those willing to contribute and given some guidance;we have final editorial review over their contributions. It is an understanding that DISL has helped double the monthly traffic at www.software.ac.uk with almost a weekly story.

Post Collaborations Workshop 2014 activities

We published a blog post on the Institute website [A:6] which includes the summary for the event.

It was heartening to know that 86% of attendees found the event useful and the Hackday had an excellent 96% approval rating. And those that attended said they would be willing to attend again and recommend it to a friend.

An annotated Agenda was also published, this included links to the lightning talk slides, videos of the keynotes, outcomes from discussion session, collaborative ideas and the Hackday ideas; we feel this is a particularly rich resource for those wanting to 're-play' the workshop.

We presented highlights and conclusions from the CW14 at the ACM SIGPLAN TRUST 2014 Workshop in June. In conclusion the CW14 highlighted that reproducible research was best served by being ready to collaborate both technically and as a mindset (collaborations readiness), striving to build and use better tools and practices in reproducible research (capability enhancement) and training and promotion of the need for reproducible research (advocacy). Links to the position paper and associated slides were added to [A:6].

Collaborations Workshop 2015

The theme for CW15 will be 'Effective interdisciplinary working' based on the assumption of software being involved at some stage of such process. We discussed this matter internally and decided that not only was it an area that we had a lot of experience in but also that

there would likely be a lot of interest in this theme, given that RCUK also has a heavy focus on interdisciplinarity.

Community connections

Our connections with FAIRport and ELIXIR led to a blog post on their bring-your-own-data workshop [A:10].

Intellectual Property, Copyright, Licensing and Commercialisation workshop (IPCLC)

We are organising a workshop on IP, Copyright, Licensing and Commercialisation. From previous experience this is an area which academic researchers and research support staff don't really understand very well and their actual practice seems to (try) not to worry about it too much.

However, there is a feeling that people want and need to know more about this area, e.g. some people would like to open source their software, but at the same time they are unsure about how to proceed or how to make a case to their supervisors or university.

We will be holding the IPCLC in Oxford on 11 December 2014. We have speakers from qLegal which is associated with Queen Mary's University London; they give advice on IP matters to QMUL academics and associated startups. We have also speakers from Oxford Research Services and from the Open PHACTS foundation that are talking about collaboration agreements and associated IP agreements between Academia and Industry (specifically Pharma companies).

A representative from Oxford Research Services (Phil Clare) and from qLegal (Patrick Cahill) have agreed to be on the steering committee for the workshop which is set to have its first meeting on 11 September 2014. The Institute's Advisory Board very kindly suggested these names when we mentioned our intentions at the last meeting.

Earlier in July we sent out a 'hold the date' message and in August we opened registrations.

Prior to opening registrations there was some discussion internally about the registration form. So we designed the registration form with the feedback form in mind. This was done so that we could compare like with like and be able to more accurately measure the improvement of those who attended. This increased focus on 'asking the right questions' was due to our exploration of and increased focus on metrics as a whole in the past year.

In terms of the IPCLC we are focused on not only attracting academics but people from university IP departments, so that they can network and better understand the communities that they serve. We are also exploring sponsorship and focusing on companies that work in this space. Interestingly qLegal see their involvement as 'pro bono' work and thus a type of sponsorship.

Staffing

Aleksandra Pawlik has been 20% for this reporting period and mainly focused on keeping web pages updated for Community, chasing contributions (e.g. from CW14), publishing Conference Intelligence on the Institute website and handling Fellows. From September 2014 we envisage that beyond helping at Institute events as a facilitator or updating the web infrastructure during events she will no longer be actively involved with the Community theme as she transitions fully onto her ELIXIR-UK role.

Giacomo Peru focused more, for this period, on his Training and Directorate responsibilities but he has renewed focus of 50% or more for the upcoming Community activities (IPCLC workshop, Fellows 2015 recruitment and initial planning for Collaborations Workshop 2015).

Tim Parkinson carries on at 40%, he organised the successful Fellows mid-year meeting and will be heavily involved with Fellows recruitment and taking over some of the roles from Aleksandra Pawlik.

Aleksandra Nenadic will join the Community team from September 2014 and work at 30% helping with Fellows management and recruitment.

Alexander Hay from the Policy and Comms team spends 10% of his time on the DISL series; as mentioned above, this is a very community focused activity so it is reported in the Community section.

Shoaib Sufi remains the theme lead for Community and takes overall responsibility for Community activities as well as planning and organizing matters pertaining to the theme such as the Fellowship Programme and workshops (e.g. IPCLC and CW15).

Future work and responsibilities (September 2014 to March 2015)

In this period we will focus on the recruitment of Fellows 2015, continued management of Fellows 2014, planning and running the IPCLC and planning and running the CW15.

There are more ad hoc Community related activities such as engaging with both Fellows and non-Fellows and reaching out to a wider audience; such as attending the Clinstat workshop by Fellow Liberty Foreman or the Neuroinformatics Meeting organised by Fellow Stephen Eglen that focuses on sharing code in publications and is jointly supported by International Neuroinformatics Coordinating Facility (INCF) and the Institute.

Community is now charged with making sure that workshops the Institute runs and / or is involved in meet the potential needs of the other themes and the Directorate where possible. Also Community will be charged with analysing the feedback from the workshops from the specific point of view of seeing if we need to improve the Community theme, for example in the way we run workshops.

Community will also be contributing to the arguments being made to the funding councils about the value and work being done that is within their remit. There will be a specific focus on capturing and analysing the primary funders of those who attend Institute and related workshops where possible.

Fellows Reports, Blogs and related community outreach

News & Blog

April 14

1. [Write up of CW14 by Kenji Takeda - Microsoft Research](#) attendee/sponsor of the CW

2. [Nature Neuropod podcast speaks to SSI Fellow Stephen Eglen](#) about code sharing

3. [What is reproducibility](#) from a CW14 attendee

4. [Software and reproducible research - best of the tweets](#) from CW14

June 14

5. Continuing Fellow Mel Sandells used the SSI blog to [promote the MICROSNOW workshop](#) which SSI are supporting

6. [Collaborations Workshop 2014](#) - outcomes and analysis write up of the outcomes of the CW14 published; this included annotated agenda, TRUST14 position paper and slides

July 14

7. [Call for participation for the first 2020 Science/SSI Paper Hackathon on Computational Life Sciences](#) by Fellow Derek Groen is running a paper hackathon on computational life science - we are promoting it (as well as funding it through the Fellowship) - it's novel and exciting - even if only 10-20% of the problems make it as papers.

8. [Call for Papers: Recomputability 2014](#) is being co-chaired by Fellow Tom Crick and SSI Director Neil Chue Hong; a call for paper was promoted this month.

9. [The Reproducible Research Vibe from the Fellows 2014 summer meeting](#)

10. [First FAIRport-ELIXIR BYOD Workshop](#)

August 14

11. [Drishti - software training](#) promotion of Fellow Farah Ahmed's workshop supporting Micro CT visualisation software

12. [Hackathons with a difference: writing collaborative papers](#) By Derek Groen, SSI Fellow and Research Assistant, Centre for Computational Science, University College London

13. [Bioconductor conference – R-based and open-sourced](#) By Laurent Gatto, Software Sustainability Institute Fellow

Conference Reports

April 14

14. [Microsoft Azure training report](#) by Fellow Alexander Konovalov

May 14

15. [Faraday Discussion 169: Molecular Simulations and Visualization](#) by By Phil Fowler, SSI Fellow and Postdoctoral researcher, Department of Biochemistry, University of Oxford

16. [Software Carpentry Instructor Training 2014](#) By Phil Fowler, SSI Fellow and Postdoctoral researcher, Department of Biochemistry, University of Oxford

17. [EVA Florence 2014](#) By Stuart Dunn, SSI Fellow and Lecturer, Centre for e-Research, Kings's College London

18. [Clinical Fellow Focus Group Meeting 2014](#) By Liberty Foreman, SSI Fellow and PhD Candidate, ISMB, University College London

June 14

19. [Joint Model-data workshop for the Late Pleistocene evolution of the Greenland and Antarctic ice sheets](#) by Fellow Leanne Wake. Leanne had a number of consultative meetings with SSI (community and consultancy/RSG) to better understand how best to bring her community together to build a sustainable platform for sea level change

July 14

20. [Digital Humanities 2014 pre-conference events](#) by Stuart Dunn, SSI Fellow and Lecturer, Centre for e-Research, Kings's College London

21. [MST14/iMST1 Conference](#) By Alex Chartier, SSI Fellow and Research Scientist at Johns Hopkins Applied Physics Laboratory

Day in a Software Life (DISL)

(started being reported in Community from May)

May 14

22. [Teaching Digital Culture](#) by Dr Tim Jordan, Senior Lecturer, Department of Digital Humanities

23. [The Google Maps of 18th Century London](#) by Peter Rauxloh, Director of Technology Services at Museum of London Archaeology (MOLA)

24. [Are we virtually there yet? Bringing back the luxury of air travel](#) By Mirabelle D'Cruz, HFRG Director of European Research, Faculty of Engineering at the University of Nottingham.

25. [Bringing forensic science to the masses](#) By Niamh Nic Daeid, Professor of Forensic Science at Centre for Forensic Science, University of Strathclyde.

July 14

26. [Google Glass in the operating theatre](#) by Shafi Ahmed, Colorectal Cancer Lead at Barts Health NHS Trust and Associate Dean at Queen Mary University of London.

27. [3D archaeology - now low-cost, high-volume and crowd-sourced](#) by Andrew Bevan, Senior Lecturer, UCL Institute of Archaeology.

28. [Venerable beads – tracing the origins of ancient jewellery](#) By Beatrice Demarchi, Research Fellow at the Department of Archaeology, and Dr Julie Wilson, Lecturer at the Department of Chemistry. University of York.

29. [Smart Glasses – a new vision for the visually impaired](#) By Dr Stuart Golodetz, Postdoctoral Research Associate at the Nuffield Department of Clinical Neurosciences, University of Oxford, and head of object detection and tracking for the Smart Glasses Projec

August 14

30. [Going viral in social media - networks & intercepted misinformation](#) By Luke Sloan, Matthew Williams and Pete Burnap of the COSMOS Project, Cardiff University.

31. [Veri.ly – getting the facts straight during humanitarian disasters](#) By Victor Naroditskiy, Post-Doctoral researcher on the ORCHID project, University of Southampton.

32. [Making the dead (Trigonotarbid) walk](#) By Russell Garwood, 1851 Royal Commission Research Fellow at the School of Earth, Atmospheric and Environmental Science, University of Manchester.

Other

April 14

33. [Annotated Agenda for CW14](#) with links to talks, slides, and sessions

34. Fellow Allen Pope mentioned the Institute at this [Science and Society Workshop](#) even though we did not provide any funding

May 14

35. [The Importance of Data and Code Sharing: Reproducible Software and Reproducible Research](#) by Fellow Leane Wake

36. How many people do you tell about SSI at conferences you attend, [Results and Analysis](#)

June 14

37. [Summer School on Experimental Methodology in Computational Science Research](#) being organised by team which Fellow Alexander Konovalov is associated with

38. Recomputability 2014 being arranged by Fellow Tom Crick and Neil Chue Hong December 8-11 2014

July 14

39. Presentation at ACM SIGPLAN TRUST 2014 workshop co-located with PLDI 2014 with outcomes of CW14 around Reproducible Research by Shoaib Sufi (Community Lead)

August 14

40. Registration now open for IPCLC - Intellectual Property, Copyright, Licensing and Commercialisation Workshop

41. The Research Software Engineer AGM and Hackday - Registration now open

42. Fitbit announces sponsorship for RSE Hackday

43. Github announce sponsorship of RSE Hackday

Consultancy

Highlights

- The Open Call has had its fourth round of selection, while three projects have completed and two more are starting up

- The team keeps being involved in other three externally funded projects, outside the Open Call

- We started to design and collect metrics to measure the impact of the Consultancy team's work; the results so far have been very positive

- We partnered with several research groups and submitted seven proposal to SFTFII, three with Edinburgh as coordinator, four with Southampton

- The name of the team changes into Research Software Group (RSG)

The Open Call

The Institute's Open Call for projects accepts submissions from researchers who wish to improve their software, their development practices, and their community of users and contributors. Our consultants work closely with successful applicant research teams to assess these aspects, providing recommendations for improvement, and assisting with the implementation of those recommendations. An Open Call project typically runs for between 26 months, where we work together with successful applicants to develop a tailored work plan suitable for the project.

There have been four completed rounds of the Open Call to date:

- Open Call round 1: September 2012 - January 2013 - all projects have completed

- Open Call round 2: February 2013 - April 2013

- Open Call round 3: May 2013 - October 2013

- Open Call round 4: November 2013 - April 2014

For more information on projects from the first, second and third rounds of the Open Call, please see the project updates in the September 2013 - March 2014 Status Report and the published case studies on the website.

The following projects completed from the second round of the Open Call, with the following highlights:

- **ParaFEM (Feb 2014 - Apr 2014):** with the project finishing in July, our Development Review of the Finite Element Method ParaFEM software and assistance in improving the packaging, accessibility and installation testing of the software has already yielded a significant impact return in terms of adoption (see the *Impact Metrics Collection* section below for more details).

- **DawnScience (Dec 2013 - Mar 2013):** with the project finishing in April, we presented an overview of the Institute and the work done with the DawnScience team at the DawnScience Developers workshop which was well received. We're also investigating EU H2020 funding options for calls in the new year building on this work, with consultancy providing a periodic 'quality control' assessment of the work conducted.

Projects highlights from the third round of Open Call projects include:

- **TPLS (Apr 2014 - Jul 2014):** having completed, this project has significantly increased the ease with which this computational fluid dynamics software can be configured and results reproduced. This removes a key usability barrier, enabling new users who are not developers to make use of the software, whilst protecting the critical research metadata used to drive simulations by separating configuration from code. This metadata has significant value in publications, and hence this means developed code can be shared without unveiling this metadata. The users are also realising benefits from the separation of pre-processing and core-processing tasks, now needing only the core-processing aspects to run on supercomputer infrastructure. This saves the researchers time, in terms of preparation and supercomputer use.

- **CGAT (Sep 2014 - Nov 2014):** selected as a lower priority project, planning has begun, with work scheduled to begin in early September. The CGAT team want to investigate ways to publish their scripts and processing pipelines (workflows) to the community. As trainees leave the CGAT centre and return to their labs they want to take the tools with them. Hence, this work will include a development review, advice on making the software more portable and easily deployable, and a recommended strategy for managing software support requests.

From the fourth round of the Open Call that closed on April 30th, the Distance project was selected from the University of St. Andrews. Their Distance software estimates animal population sizes, and is used by biologists, students and policy makers to better understand these animal populations. With a 15 year development history and over 30,000 downloads, they will get our help to improve how they manage the burgeoning suite of recent and legacy plugins, and to reduce the increasing cycle time from publication of algorithmic theory to working code. This work will be conducted from September 2014 - December 2014.

As part of the review process for this call, we also rejected an application from the School of Geosciences at Edinburgh due to a poor application. It was also decided that another application from DNAdigest.org, a non-profit organisation to promote and enable open access to genomics research, whilst not warranting a full Open Call project, would benefit from a small amount of effort in terms of guidance and a possible community survey. This has been scheduled as a lower priority activity.

Externally Funded Projects

Within the APES project, significant process has been made in analysing and improving the performance of the parallel codebase. An investigation into how other molecular dynamic codes have decomposed their domains has informed the strategy for how to optimise using OpenMP. Two consultants involved in the work attended a project F2F in San Francisco in mid-August.

Additional Consultancy Projects

VAMPIRE (Sep 2014 - Dec 2014): VAMPIRE is an international initiative led by Manuel Trucco (University of Dundee) and Tom MacGillivray (University of Edinburgh), that develops a software platform which enables efficient measurements of the retinal vasculature with large numbers of fundus camera images. The software is being used in an increasing number of retinal biomarkers studies, including cardiovascular, stroke, genetics, sarcopenia, and neurodegenerative diseases. Following initial consideration of Software for the Future II as an initial target for partnered funding (out of scope), the Institute will be providing effort to technically assess the software and adopted development practices. This assessment will inform a case for support as a basis for the Institute and the VAMPIRE team to pursue funding to resolve these issues. A Non-Disclosure Agreement has already been signed between the involved partners so the Institute has access to the codebase, and work will begin in early September.

Recomputation.org: initially, we helped develop an overall architecture for how the recomputation.org site will interface with a variety of cloud providers. Building on this, investigations into supporting the Azure cloud platform have so far enabled improved integration between the web portal interface and Azure, as well as allowing experiments (as Virtual Machines) to be converted and uploaded to Azure, or created *in situ* within Azure where they can be exported from the Cloud into a longer-term storage infrastructure. We have also assisted in the preparations for the Summer School on Experimental Methodology in Computational Science Research, and presented two sessions at the School: "Better Software, Better Research: Why reproducibility is important for your research" and "Developing Sustainable Research Software".

Impact Metrics Collection

A plan was developed in June, and its implementation begun in July, to determine the impact of our consultancy projects beyond what we already collect from case studies and end of project reports. Taking into account suggestions made at the last Advisory Board, this entailed the collection of the following types of impact data from projects with whom we have previously worked:

- Quantitative metrics ('breadth' impact): this took the form of a survey capturing impact in terms of conducting research, developing software, project management, community and collaborations, funding, and other factors where impact may have been realised. Questions largely took the form 'To what extent has the work helped you to do x...', allowing us to collate and analyse responses quantitatively across all projects.

- Qualitative interviews ('depth' impact): an interview template was designed to pull out in-depth qualitative responses to responses made in the quantitative survey.

Initial responses have been very strong (taking into account the holiday season). Some highlights from 12 responses so far to the quantitative survey are:

- Four instances of a 'game-changing' impact were reported, across three projects: in the areas of reproducibility, software community relations and software maintainability (two instances).

- 82% of projects reported a significant improvement in the longer-term future of their software (100% reporting at least a moderate improvement).

- 73% of projects reported a significant improvement in the longer-term future of their software (100% reporting at least a moderate improvement).

- 56% of projects reported at least a moderate reduction in the time taken to obtain search results.

- 44% of projects report at least a significant improvement in the ability of themselves or other stakeholders to reproduce research results (100% reporting at least a moderate improvement).

- 64% of projects report implementing at least 70% of recommendations made by the Institute.

- 9 projects reported our work helped them in writing proposals, with 3 of those reporting our work directly helped them to secure funding.

- All projects would work with the Institute again, and 9 responses indicate specific ideas for further collaborations (e.g. potential partnering on a bid, further technical work).

A few statements from the 6 qualitative interviews conducted so far include:

- *"As a result of the work with the Institute … several new contributors / collaborators have begun working with ParaFEM. These include: University of Glasgow, University of Bristol, Culham Centre for Fusion Energy, Fusion Doctoral Training Network (University of York), Technical University of Bern, University of Delft, Colorado School of Mines, Los Alamos National Lab, Lawrence Livermore National Lab, Fujitsu"* - Lee Margetts, ParaFEM

- *"Working with SSI, we now have a stable version, a test harness and test suite, and having it organised into SubVersion, is something we feel we can now offer through the licensing. Pfizer have purchased a licence. We're getting more requests from academics and external academics wanting to use the software. … [Now] doing far larger problems than ever envisaged when DMACRYS was first developed"* - Sally Price, DMACRYS

- *"…more developers are now contributing … There's like a whole project looking at water hydration and water entropies using my code as the framework… It's completely new science and they can do that because they can understand and extend my code"* - Christopher Woods, AMRMMHD

This retrospective impact gathering for previous projects will continue in the coming months, and has been worked into our normal post-project follow-up process: qualitative interviews will be conducted as part of our existing case study process, and quantitative

surveys will be sent out 6-monthly and yearly to each project, to ensure 'deferred' impact is captured.

The Consultancy theme has also provided technical effort to Policy and Communications to assist their studies into assessing the academic job market for developers, percentage spend on software-reliant research, and the size of the research software community.

EPSRC Software for the Future II - Submitted Proposals with Institute Involvement

Following on from the SFTFII leads discussed in the previous Status Report, we partnered with a number of projects into that call, either as a project partner or providing daily rate-based consultancy.

Those submitted with Southampton as contributor:

- Gas Turbine Simulation (Cranfield University, Suresh Sampath)

- Cadabra (University of Dundee, Kasper Peeters)

- LowerLimbModel (Imperial College London, Angela Kedgley)

Those submitted with Edinburgh as contributor:

- LAMMPS (Imperial College London, Catherine O'Sullivan)

- BioSimLib (University of Edinburgh, Julien Michel)

- LibHPC3 (Imperial College London, John Darlington)

- BASIL/FABBER (University of Oxford, Michael Chappell)

We also had initial discussions with the BioJS, VAMPIRE, ForestGrowth-SRC, RODAN and recomputation.org projects about submitting into SFTFII, but in each case either the call was out of scope for those projects' objectives or the heavily oversubscribed nature of the call led to reticence to submit a full proposal.

Dissemination

Events

- Presented 'Developing Sustainable Research Software' session at the Experimental Methodology in Computational Science Research (EMCSR) Summer School in August, organised by the recomputation.org team, University of St. Andrews, 08/08/14

- Presented an overview of the Institute and the work done with the DawnScience team at the DawnScience Developers workshop, 05/07/14

Blog posts from the Consultancy theme

- Optimising OpenMP implementation of MD modelling package Tinker, APES, Weronika Fillinger, 06/08/14

- Oh research software how shall I cite thee?, Mike Jackson,30/07/14

- A look at FORTRAN unit test frameworks, Mike Jackson,22/07/14

- HPC enters a solid new discipline: ParaFEM, ParaFEM, Lee Margetts, 13/05/14

- Parallel sustainability with TPLS, TPLS, Mike Jackson, 07/05/14

- Exploring the integration of Subversion and Git with CVS, BASIL/FABBER, Mike Jackson, 01/04/14

Case studies (with Policy and Communications - two additional case studies to appear shortly)

- Improving laboratory mobile app software for wider uptake, LabBook, 11/04/14

  "[The consultancy work] was really useful – pragmatic and actionable. The SSI team have a lot of experience and can offer perspective on what works and what doesn't. Now we just have to work through and put the advice into action" - Mark Woodbridge, LabBook

Other publications, news articles, etc.

- Optimising OpenMP implementation of MD modelling package Tinker, APES, published on EPCC blog, Weronika Fillinger, 06/08/14

- Computational Fluid Dynamics, Parallel sustainability with TPLS, published in EPCC News 75, Mike Jackson, Summer 2014.

- CFD: parallel sustainability with TPLS, TPLS, published on EPCC blog, Mike Jackson, 28/04/14

- Exploring the integration of Subversion and Git with CVS, BASIL/FABBER, Mike Jackson, 07/04/14

General

Based on a suggestion offered at a previous Advisory Board, the 'Consultancy' group has been externally renamed the 'Research Software Group'. A poll of Fellows and previous consultancy projects, where they were presented with a number of options including the current name, yielded the new name. It is felt that this better reflects the nature of what the group are and do, and is more closely aligned with (and supports!) the policy work on Research Software Engineers. In a similar vein, Institute consultants will be referred to as Institute RSEs.

Policy and Communications

Highlights

- Conducted research into the size of the research software community - a new aspect to the Policy team's work

- Significant interest in the Research Software Engineers AGM and hackday, which picked up a number of sponsors: Amazon, Fitbit, Google, Github, Microsoft Research and the main sponsor Maudsley Digital

- Ashley Towers became the first person to use Research Software Engineer (RSE) resources to help him lobby for his job title to be changed to RSE

- The RSE campaign was featured in Research Fortnight

- We released an app!

Overview of the last six months

The last six months have seen the Policy team focussing on a study of the research software community. This type of study is of significant interest to the Institute, because it allows us to better understand our community, draws attention to the causes we support and cements our position as the authority on research software. Generating original research that can be used by other research stakeholders is a key step in maturing the policy theme and ensuring its sustainability.

The small size of the team tasked with responsibility for policy, communications and deputy directorial duties (2 FTEs with an additional 0.6 of developer effort over the last two months) necessitated a change in focus away from communications, which was accompanied by a reduction in the number of blog posts we released and visitors to the site. Despite this reduction in effort, we have still seen significant traffic on the site and we continue to rapidly accrue Twitter followers. The quality of the content drives people to the site - even if there's less of it. The addition of developer effort to the team has proved invaluable for the studies we have been conducting, so ensuring long-term access to development effort is now one of our goals.

The RSE campaign achieved a notable achievement over the last six months: a "computer officer" used our resources to successfully lobby for a change in his job title to Research Software Engineer. This change was made without the RSE in question contacting the Institute, which shows that the content on the RSE site is sufficient to persuade at least one university to adopt the title for its staff.

The RSE community will hold its first AGM on 15 September followed by a hackday on 16 September. This will be accompanied by an election of a new committee (on which the

Institute has a permanent *ex officio* position). Once the election has been conducted, we will have a committee that democratically represents the RSE community.

A lack of effort also affected our website, because we lost our web developer at the start of the year. A stop-gap for this position has only just been found and was put into place in August. This lack of effort put the website infrastructure into stasis. We could provide content, but could not change the way that content is provided or address bugs.

Quick statistics for 1 April 2013 – 18 August 2014

- 50 blog posts

- 44,655 unique visitors to the website

- 399 new followers on Twitter (bringing total to 2186)

- 258 retweets

- 2 days at 1000 unique visits

Size of the research software community

We were tasked with finding the size of the research software community. Something we aimed to investigate through a range of different methods. Three of these methods have produced results over the last six months.

First of all, we found the size of the research community, which can be used as a comparator: HESA results indicate that it contains 250,000 researchers (staff and postdoctoral students).

To gain a better understanding of the community, we are pursuing one direct and two indirect studies.

The direct study is to conduct a survey of the research community. We tried to get outside help with the survey but found that external partners were too expensive, too slow or were not closely enough aligned to our community to benefit from it. This meant that the team has acquired a number of new skills in survey design, ethics procedures, data protection, and web scraping - all skills that will be invaluable in the future, but that have taken some time to acquire. The results of the survey will be presented at the advisory board meeting in September.

A second study investigated the grants data that is available on Gateway to Research (GTR). It took some time to determine the extent of the data available on GTR, but we eventually found 50,000 results that stretch back to 1973 (but are mainly focussed on the last decade

or so). These records were searched to find terms that relate to the use and development of software, which has allowed values of the percentage spend on software-reliant research to be generated.

Finally, we have been harvesting data from jobs.ac.uk to investigate how many academic positions require the development of code as part of their job. If these results are representative of the research community, it would appear that there are very few academic positions explicitly require software development skills. We know that there is a significant amount of software developed in research, so this would indicate that the vast majority of software is developed by people who were not recruited to do so - something we have assumed for some time.

Two posts discuss the work we have been conducting:

- http://www.software.ac.uk/blog/2014-05-28-how-many-researchers-rely-software-want-know
- http://www.software.ac.uk/blog/2014-07-10-first-steps-towards-understanding-size-research-software-community

RSE

The AGM and hackday occur after the reporting period of this report, but will be discussed at the Advisory Board.

The Research Software Engineers campaign had two goals over this period: organise a hackday and prepare the ground for the election of a new committee before the end of 2014.

Finding sponsors for the AGM and hackday was surprisingly easy, which is most likely an indication that people understand the importance of the RSE role when choosing the technology that is used within research. Maudsley Digital, a mental health charity, were the main sponsor, provided a venue and acted as a guarantor for the costs of the catering and other standard costs. Fitbit provided free devices to be used during the hackday, Github paid for the dinner and Google, Amazon and Microsoft provided free cloud resources and prizes for the hackday.

The election of a new RSE committee is an important step in the maturation of the RSE Community. We feel that the Committee must be chosen by the community if it is to be representative of it. Of course, the Institute maintains a keen interest in the community, and will have an *ex officio* post on the committee (which also allows us to keep an eye on the new committee to ensure that the community is not allowed to drift). The election will be announced at the AGM and voting will take place soon after.

General

- A few general policy and communications tasks have been taken forward over the last six months.

- We used a contact developed at a workshop to sell our work with RSEs to Research Fortnight, who published an article on the subject in July.

- We released a new flyer based on our "Better Software Better Research" theme, and backed that up with stickers, and a new Twitter homepage login.

- The front page text of the website was updated to bring up to date with the work of our themes.

- We released a new flyer and poster at the CDT Directors' meeting in July.

- We continued to build our links with CANARIE, who are interested in emulating our work in Canada. This led to CANARIE sending a representative to the RSE AGM and hackday.

- We developed an idea to run, potentially a series, of workshops with Microsoft Research and If I Can She Can, which will aim to understand gender bias at hackdays and in software developers. Aside from its research interest, this work should also help promote our work with "women in software" and will direct some publicity towards the Institute.

- To help continue our work with the research software community, we are investigating a collaboration with Robert Stevens at the University of Manchester. This will allow us to mine journals for clues to the use of research software. It's a significantly more extensive project than our current studies, but would allow us to investigate over a much wider range of disciplines and over a longer duration.

Training

Highlights

- Software Carpentry is growing in popularity and ever more requests are arriving from all over the UK to organise workshops

- The growth of Software Carpentry is a sign of success both for the model and for the Institute, but parallely is demanding an increased coordination and administration effort; a response to this is the ongoing endeavour of the community to improve its infrastructure and processes (Mozilla Science Lab Sprint), to which the Institute is actively participating

- The first face-to-face Software Carpentry Instructors Training took place in Toronto last April and the first in the UK is due to be held in TGAC, Norwich, in October 2014

- Data Carpentry is a new type of workshops, emanating from the experience of Software Carpentry and focused on skills for data management

- Following a joint proposal for the NERC short courses, a collaboration has started with the University of Leed for the organisation of two workshops

- A workshop is planned for EPSRC & MRC Centre for Doctoral Training in Regenerative Medicine Manchester

- The collaboration between the Institute and Elixir UK is ongoing and ever more centred on the work of Aleksandra Pawilk, who, in the next months will shift a significant part of her engagement from the former to the latter

Software Carpentry

UK Coordination and Administration

The Institute provides administrative support for Software Carpentry workshops in the UK. The support includes: finding and securing instructors for workshops, liaising with hosts and helping them organize workshops, setting up the necessary infrastructure (registrations, mailing lists, questionnaires, etc) and recording relevant information in the Software Carpentry repository (database).

The Training theme in the Institute is carried out by Aleksandra Pawlik and Giacomo Peru. Giacomo provides 0.3 FTE effort in administration support and Aleksandra around 0.2 FTE. If Software Carpentry in the UK develops further as is happening, and the Institute's

engagement in the initiative continues, the administration will most likely require 1 FTE staff in 2015.

Workshops

In the past 5 months (April - August 2014) the Institute coordinated the organisation and realisation of 6 Software Carpentry workshops.

Table 1: Software Carpentry workshops run in the UK, April 2014 - August 2014

Date	Location	Main audience	Instructors
April 2014	University of Warwick, GARNet	Plant scientists	Aleksandra Pawlik, Christina Koch
May 2014	NOCS, University of Southampton, UK	Oceanographers	Devasena Inupakutika, Bogdan Vera
June 2014	Istituto Nazionale di Fisica Nucleare, University of Pisa, Italy	Physicists	Aleksandra Pawlik, Rémi Emonet
June 2014	University of Reading, UK	Maths and Physics	Christina Koch, Devasena Inupakutika
July 2014	Nottingham, University of Sheffield, UK	Ecologists	Devasena Inupakutika, Aur Saraf
August 2014	University of Cambridge, UK	Biologists	Robert Beagrie, Thomas Kluyver

(*) indicates an Institute's Fellow organising and/or instructing at the workshop

underline indicates an Institute staff member instructing at the workshop

Full day course on Git and GitHub for University of Manchester

Aleksandra Pawlik taught a full-day Git and GitHub course at the University of Manchester on 16th June 2014 for postgraduate students and staff. The organisation of this course was

suggested by one of the Institute Fellows, Mike Croucher. Mike came up with the idea to run such course after the Software Carpentry workshop in Manchester. Aleksandra extended the Software Carpentry materials (originally designed for a 3 hour module). The feedback from the course was very positive.

The materials are available online and the Institute is likely to reuse them (there is a request from women-in-tech group in Cambridge to run a day course based on that material).

Instructors training

The first face-to-face instructors training for Software Carpentry took place in Toronto 28-30 April 2014. Given the increase in the demand for these workshops within the UK research community, the Institute is also engaged in expanding the instructors pool in the UK (and potentially Europe). Aleksandra Pawlik attended the event in Toronto in order to understand how such training is run.

The first UK-based F2F Software Carpentry Instructors Training will be held at TGAC. This training is scheduled for 22-23 October 2014. The course is already fully booked with participants coming not only from the UK but also the rest of Europe.

Aleksandra will be helping to run the training at TGAC.

Planned workshops

Date	Location	Main audience	Instructors
17-18 November	University of Liverpool	Biologists	Kwasi Kwakwa, TBC
Autumn 2014	JR Hospital, University of Oxford, UK*	Medics	Phillip Fowler, Aleksandra Pawlik
December 2014	University of Exeter, UK	Biologists	TBC

Winter 2014	CCPi, UK*	Medics	Mark Basham, TBC
January 2015	University of Oxford	Geologists	TBC
April 2015	Imperial College, London, UK*	TBC	TBC

(*) indicates an Institute's Fellow organising and/or instructing at the workshop

<u>underline</u> indicates an Institute staff member instructing at the workshop

Training for Centers for Doctoral Training

Leaflet for CDTs and Simon Hettrick's participation in the CDTs directors meeting

On 7th July, Simon Hettrick attended the CDTs directors meeting in London. He approached and discussed with a number of people the training that the Institute offers to CDTs.

Before the event Simon prepared (with some feedback from Neil and Aleksandra) a leaflet presenting the Institute's training offer for the CDTs.

From Simon's post-event report:

"I got the sense that the people who talked to me were sold on the usefulness of the training, so I think our only problem will be getting them to accept the cost. I didn't push the tailored courses, and I have to say that most interest was in a general workshop anyway. The other general point is that most people, if not all, were interested in the per student cost for a workshop being run at a centralised location. As we assumed, it would seem that we now have some work to do in order to bring together the geographically close CDTs."

CDT course for EPSRC & MRC Centre for Doctoral Training in Regenerative Medicine Manchester

The Institute has been approached by Cay Kielty, the Director of the new EPSRC & MRC Centre for Regenerative Medicine at the University of Manchester. Cay is interested in the training package which the Institute offers. The first contact with Cay was made by Simon after the initial push for the CTD courses at the meeting in Swindon in May 2014.

The training will be based on the standard Software Carpentry workshop curriculum and the planned date 4-5 February 2015 (TBC). There will be about 12 students.

NERC Training for University of Leeds

The Institute was a partner in the proposal submitted by Andrew Walker, NERC Independent Research Fellow at School of Earth and Environment, University of Leeds. There will be 2 workshops, one in November 2014 and the second one in January 2015. Devasena Inupakutika will be the Institute's instructor at the November workshop and Aleksandra Pawlik will teach in January. The proposal submitted by Andrew is largely based on the Software Carpentry model and the teaching delivered by both Devasena and Aleksandra will be related to the SWC modules.

Training for MSc Clinical Research course, University of Manchester

This course is still being discussed and may in fact be delivered formally by Elixir UK. Professor Andy Brass (University of Manchester) would like to run a 5 day course for the MSc students in Clinical Research. The course objectives would be focusing on software engineering and management of software projects (requirements gathering, Agile development etc.). However, the students will be expected to work in teams and develop small pieces of code, and use version control as well as testing. The teaching will be based on the Software Carpentry materials. This course is planned for February 2015.

Data Carpentry

Data Carpentry (DC) is an initiative which spins out of Software Carpentry. DC aims to train researchers how to handle different sets of data in an efficient and sustainable way. The curriculum is cross-disciplinary and includes modules on moving datasets management from spreadsheets to R, Python and databases. The materials are constantly being developed (see below the details of the Mozilla Science Lab Sprint).

Aleksandra sits on the Board of Directors together with Tracy Teal, Hilmar Lapp, Karthik Ram, Karen Cranston, Greg Wilson and Ethan White.

Data Carpentry has been strongly supported by Elixir UK, which has significant funding to support the development of the materials and running workshops. The UK DC first workshop is planned for autumn 2014 (most probably in Manchester).

Mozilla Festival

As of the moment of writing this report there are plans to submit a proposal for a session related to Data Carpentry for Mozilla Festival 2014 (October 24-26). Aleksandra Pawlik and (potentially) Karthik Ram may be running this session representing Data Carpentry (and the Institute, in case of Aleksandra).

Mozilla Science Lab sprint

The first Mozilla Science Lab global sprint (22-23 July 2014) focused on developing materials and infrastructure for Software Carpentry and Data Carpentry. Aleksandra Pawlik helped lead the team in Krakow, Poland, which focused on Data Carpentry lessons. Lessons for handling data in Excel, Python+pandas+matplotlib and shell were developed and reviewed. There were 19 teams across the world that took part in the sprint. From Edinburgh, Neil Chue Hong and Giacomo Peru participated to the sprint developing Software Carpentry admin tools with the help of another researcher, Ernest Walzel, who, after participating and becoming aware of the activity of the Institute is now considering applying for the Fellowship Programme 2015.

Collaboration and link with Elixir UK

Aleksandra Pawlik is currently acting as the Technical and Infrastructure Training Coordinator for Elixir UK. The role involves working with different training initiatives, in particular with Data Carpentry and Microsoft Azure for Research. Aleksandra will work on the development of strategies for computational training for life scientists, something which aligns with many of the Institute's activities, and will engage in training for the researchers based in the UK, through the work with Elixir UK.

Potential collaboration with DCC

Thanks to Simon Hettrick the Institute is in touch with Joy Davidson from Digital Curation Centre. DCC is very interested in Data Carpentry, training material and approach to teaching. Data Carpentry board is also interested in developing some collaboration with DCC.

Feedback from industry placements for SWC workshop alumni

The alumni of the University of Reading SWC workshop are now undertaking their industry placement schemes. Kathie Bowden, who coordinates the placement programme, agreed to include some questions on behalf of the Institute in the survey which is going to be conducted among the employers who host the students. This should provide the Institute with some additional metrics for measuring the impact of the training.

High Performance Carpentry

There is growing interest in developing "High Performance Carpentry" training based on the SWC model for High Performance Computing. The training would cover the introductory level which should fill in the gaps in training that is currently provided. It is possible that some funding for such training may be available. This initiative needs further investigation.

Dissemination

Blog posts

- *A sprint to new materials for Software Carpentry* - By Aleksandra Pawlik - http://www.software.ac.uk/blog/2014-08-01-sprint-new-materials-software-carpentry

- *Software Carpentry workshop in Pisa* - By Aleksandra Pawlik - http://www.software.ac.uk/blog/2014-06-23-software-carpentry-workshop-pisa

- *Software Carpentry combats imposter syndrome... and out of date witticisms*- By Aleksandra Pawlik - http://www.software.ac.uk/blog/2014-05-29-software-carpentry-combats-imposter-syndrome-and-out-date-witticisms

- *How I learned to stop worrying and started to love teaching software skills* - By Leszek Tarkowski, software trainer at Infotraining, certified Software Carpentry instuctor and former research scientist in material sciences - http://www.software.ac.uk/blog/2014-05-06-how-i-learned-stop-worrying-and-started-love-teaching-software-skills

- *Software Carpentry at GARNet* - By Aleksandra Pawlik - http://www.software.ac.uk/blog/2014-05-02-software-carpentry-garnet

News items

- *2nd Workshop on Sustainable Software for Science: Practice and Experiences (WSSSPE2)* - http://www.software.ac.uk/news/2014-05-14-2nd-workshop-sustainable-software-science-practice-and-experiences-wssspe2

- Linux and virtualisation technical training officer at The Genome Analysis Centre - http://www.software.ac.uk/news/2014-05-14-linux-and-virtualisation-technical-training-officer-genome-analysis-centre

- Job Openings at the Mozilla Science Lab - http://www.software.ac.uk/news/2014-05-14-job-openings-mozilla-science-lab

- Engage in global open science: take part in the Mozilla Science Lab + Software Carpentry sprint - http://www.software.ac.uk/news/2014-07-21-engage-global-open-science-take-part-mozilla-science-lab-software-carpentry-sprint

- WSSSPE2 deadline extended - submit your papers on sustainable scientific software by July 21st - http://www.software.ac.uk/news/2014-07-14-wssspe2-deadline-extended-submit-your-papers-sustainable-scientific-software-july-21

Top tips and guides

- *Early career researchers publish dataset to understand plankton and the carbon cycle* - By Dr. Róisín Moriarty Tyndall Centre for Climate Change Research - http://www.software.ac.uk/blog/2014-05-16-early-career-researchers-publish-dataset-understand-plankton-and-carbon-cycle

Our blog posts on the Software Carpentry website

- *Software Carpentry workshop at GARNet by Aleksandra Pawlik, Christina Koch in workshop - http://software-carpentry.org/blog/2014/04/garnet-workshop.html*

- *Technical Training Officer (LVT Training Officer) position at TGAC by Aleksandra Pawlik - http://software-carpentry.org/blog/2014/05/job-opening-at-tgac.html*

- *Learning to Teach Never Ends by Aleksandra Pawlik -*
  http://software-carpentry.org/blog/2014/05/after-instructor-training.html

- *ARCHER Software Carpentry boot camp and Introduction to Scientific Programming in Python by Mike Jackson -*
  http://software-carpentry.org/blog/2014/06/archer-cranfield-boot-camp.html

- *Feedback from the workshop at Istituto Nazionale di Fisica Nucleare in Pisa by Aleksandra Pawlik -*
  http://software-carpentry.org/blog/2014/06/feedback-from-pisa-workshop.html

- *Feedback from Cranfield by Mike Jackson -*
  http://software-carpentry.org/blog/2014/07/archer-cranfield-feedback.html

- *The Real Purpose of Sprints by Aleksandra Pawlik*
  http://software-carpentry.org/blog/2014/08/krakow-sprint.html