National School of Healthcare Science

NHS
Health Education England

Choosing your elective

Stuart Cannon
Clinical Bioinformatics - Genomics

What is this elective you speak of?

The details…

- 4-6 weeks
- Completely different to your day to day–
  - Extend learning scope
  - Introduce a different setting
  - Gain hands on experience not available on STP
  - Website examples here

What is this elective you speak of?

The competencies…

EL-C-1	Produce learning outcomes for the elective training period and link these to Good Scientific Practice.
EL-C-2	Write a report of your elective training that includes your learning outcomes (mapped to Good Scientific Practice), a critical reflection on your experience and an action plan.
EL-C-3	Plan, prepare and deliver an oral presentation that describes and reflects on the learning from your elective and shows how your experience will shape your future practice.

My elective experience

The context…

- Clinical bioinformatics trainee, 2nd Year
  - Work with genetic data

One example: SAM file

```
HWI-ST508_0109:6:1106:19590:4489#ATCACG 83      chr1    16230   255     81M296N19M      =       16179   -447    T
CAGTTGCACACACGAGCCAGCAGAGGGGTTTTGTGCCACTTCTGGATGCTAGGGTTAGACTGGGAGATACAGCAGTGAAGCTGAAGGAGACGCGCTGCT     #########
#@D.BDGFGGGGEGGGDBEE@EFF?FECBADEEBEEECE@DC?DCB@EEE@EBEEE?B<=?FFEFFFF?FFD8FFEDGFDFFGGGGGDGBG     NM:i:2  XS:A:-  N
H:i:1
HWI-ST508_0109:7:1106:5833:71661#ATCACG 83      chr1    16234   255     77M296N23M      =       16184   -446    T
TGCCCACGCGAGCCAGCAGAGGGGTTTTGTGCCACTTCTGGATGCTAGGGTTACACTGGGAGACACAGCAGTGAAGCTGAAGGAGACGCGCTGCTGCTG     #########
#C?B?C8BFDEBEEEE4<9>7AECDE?7?>>3:??2?>9:AB5=9+<8D)DDD>DDC@@3=;?;=DD?DFDEFFFFFE<BDF<9:>24+83:     NM:i:2  XS:A:-  N
H:i:1
HWI-ST508_0109:8:2103:19403:137111#ATCACG        83      chr1    16234   255     100M    =       16155   -179    T
TGCACACACGAGCCAGCAGAGGGGTTTTGTGCCACTTCTGGATGCTAGGGTTACACTGGGAGACACAGCAGTGAAGCTGAAATGAAAAATGTGTTGCTG     #########
#A:AABFGB;GGGGGGEDBACCCDE5>?<@>DE<?D?FCBFEEBDBFDFFFC>@>CDDADD>FDFFCECEEDGGFGEGGEGGGGGGGGEGGF     NM:i:0  NH:i:1
HWI-ST508_0109:7:1204:3497:194785#ATCACG        163     chr1    16237   255     100M    =       16357   220     C
ACACACGAGCCAGCAGAGGGGTTTTGTGCCACTTCTGGATGCTAGGGTTAGACTGGGAGATACAGCAGTGAAGCTGAAATGAAAAATGTGTTGCTGTAG     DD@D=DEEE
E@GGEEGGFDF<GD@CEEEEEG=FFGFBFBFHHGHDEGGF@EEEBD>>=B:DF=@FEGDGBD/DDD@DD=CBFFGFDC@/>BCDC######     NM:i:2  NH:i:1
HWI-ST508_0109:6:1104:12243:43788#ATCACG        355     chr1    16241   3       100M    =       16337   196     C
ACGAGCCAGCAGAGGCGTTTTGTGCCACTTCTGGATGCTAGGGTTACACTGGGAGATACAGCAGTGAAGCTGAAATGAAAAATGTGTTGCTGTAGTTTG     HHHHFHHHH
HCHHHHHHHHGHGHEHFHCHHHHHHHHHHHHHHHHFEHHHEHHHHHAFE?FCFFFFHEHDFFEEFEEGEGFGHHH?GDCFGGHHHF?FCGGC     NM:i:2  NH:i:2  C
C:Z:chr15 CP:i:102514823        HI:i:0
```

My elective experience

The context…

- Clinical bioinformatics trainee 2nd Year
  - Lots of computer based work
  - Ability to programme is a highly desirable skill
  - Construct data analysis “pipelines”
  - Limited patient contact
  - Work in an office space with diagnostic team and academic researchers

My elective experience

The decision process…

- How different?
- When should I do it?
- How far do I want to travel?
- What do I want to learn?
- What other competencies can I align it to?
- What are my options?

My experience

The process…

How different?

Similar but at a bit of a tangent

Not very!

How far do I want to travel?

What do I want to learn?

Computer coding, pipeline creation, working in academic setting

Competencies from two other specialist modules!

What other competencies can I align it to?

My experience

What I did

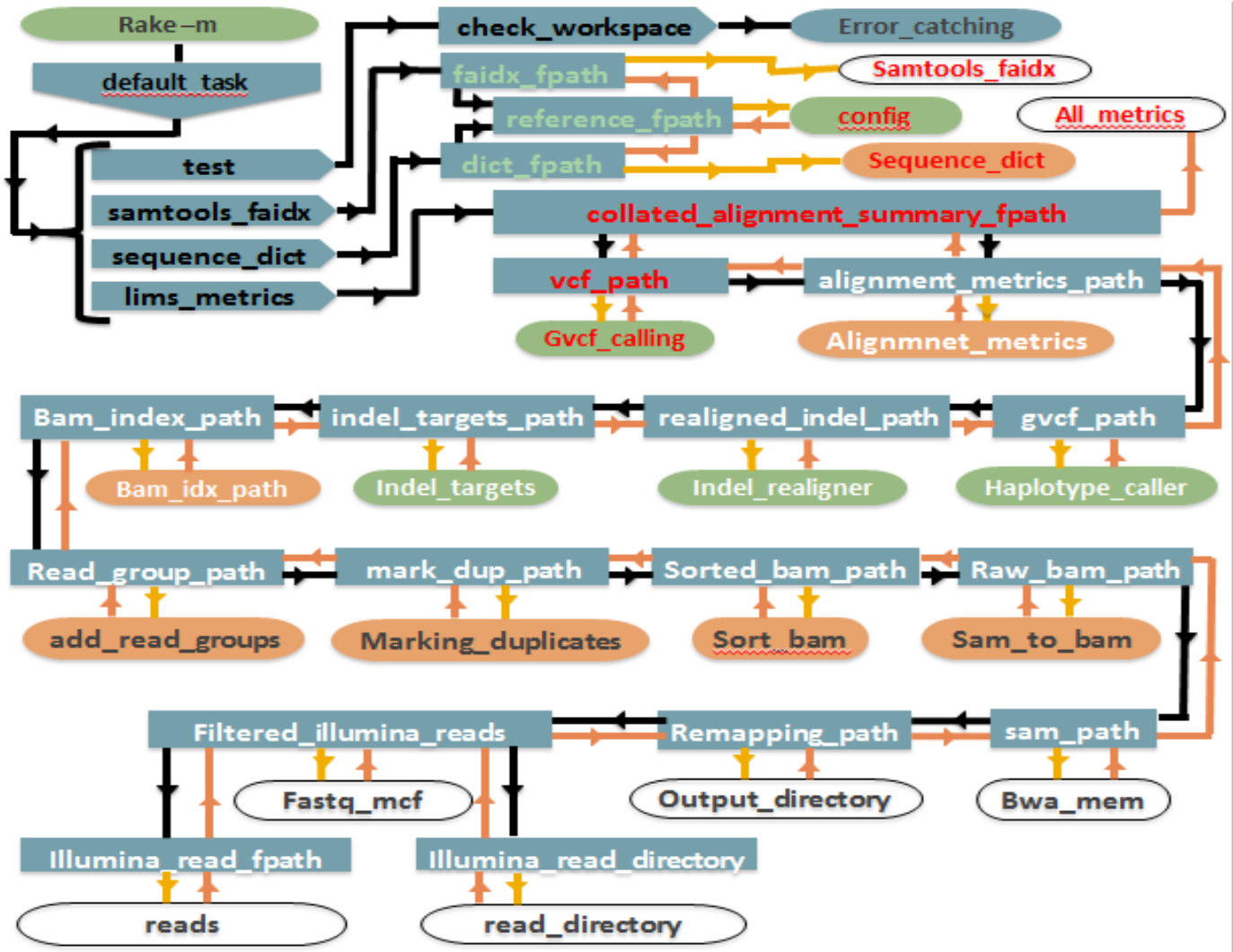
- Exeter sequencing service
- Part time 3 months
- Construct an analysis pipeline
- Object orientated programming
- Ruby programming language

What I learned

- Follow best practices to analyse genetic sequence data
- Collaborative programming
- Importance of accurate documentation

Learning outcomes mapped to GSP

Learning outcome		GSP rationale
1	Integrate with a multidisciplinary team and contribute to common goals by building upon and/or developing processes	GSP 1.3.2 ‘Work effectively as a member of a multidisciplinary team‘
2	Develop programming and bioinformatic knowledge to enable the development of a genomic DNA analysis pipeline that uses the principles of dependency based build automation, version control and quality assurance.	GSP 2.2.9 ‘Demonstrate appropriate level of skill in the use of information and communications technology’
3	Research and apply the most current and reliable bioinformatic processes to meet the aims of the elective project.	GSP 4.1.6 ‘Evaluate research and other available evidence to inform own practice in order to ensure that it remains at the leading edge of innovation’
4	Understand the importance of accurate documentation when working as part of a dynamic multidisciplinary team.	GSP 5.1.5 ‘Make suitable arrangements to ensure roles and responsibilities are covered when you are absent, including handover at sufficient level of detail to competent colleagues’


Rake –m
default_task
test
samtools_faidx
sequence_dict
lims_metrics
check_workspace
faidx_fpath
reference_fpath
dict_fpath
Error_catching
Samtools_faidx
config
Sequence_dict
All_metrics
collated_alignment_summary_fpath
vcf_path
alignment_metrics_path
Gvcf_calling
Alignmnet_metrics
Bam_index_path
indel_targets_path
realigned_indel_path
gvcf_path
Bam_idx_path
Indel_targets
Indel_realigner
Haplotype_caller
Read_group_path
mark_dup_path
Sorted_bam_path
Raw_bam_path
add_read_groups
Marking_duplicates
Sort_bam
Sam_to_bam
Filtered_illumina_reads
Remapping_path
sam_path
Fastq_mcf
Output_directory
Bwa_mem
Illumina_read_fpath
Illumina_read_directory
reads
read_directory