# Deep Learning methods in Genomic Medicine

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## 1 Introduction

Cancer

## 2 Literature review

CScape was cool, lets make it better. Gunnar Rasch has a great idea for genomes.

## 3 Project plan

| Action | Timeframe | Project Relevance |
|---|---|---|
| Research the problem | Weeks 2-4 | The dataset style used in the CScape [2] and the method proposed in the Framework for Multi-task Multiple Kernel Learning [3] are integral to this project, and so should be understood well. |
| Learn how to apply the Shogun toolkit for toy problems | Weeks 4-5 | Learning how to use an existing implementation of the Multi-task Multiple Kernel Learning will provide greater insight into expected outputs when used on more complex datasets. |
| Gain an understanding of the COSMIC [1] data | Weeks 5-6 | Selecting data to be used from the vast database COSMIC will be what is used throughout all of this project. |

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| | Weeks 6-7 | |
| | Weeks 7-11 | |
| Write Interim Report | Weeks 8-9 | |
| | Weeks 9-11 | |
| | Weeks 11-12 | . |
| Create Poster | Weeks 12-13 | Christmas break is a long period, for both revision, and Project |
| Ready for, and present in, Poster Presentation | Week 14 | |
| | Weeks 14-16 | |
| Finish Technical work, draw conclusions and consolidate report | Weeks 16-19 | Allow plenty of time to finish and polish the report. |
| Draft of one chapter/section of final report hand-in. | Week 17 | Section is written during consolidation period |
| Proofread | Week 19-20 | |
| Submit full draft of final report and poster | Week 20 | |
| Update report and poster with any relevant details from Supervisor Dr Colin Campbell | Week 21 | |
| Proofread | Week 22 | |
| Final hand-in date for report and poster | Week 22.3 (First week of easter) | Noted for completeness, hand-in should be late Week 21/ early Week 22 |

# 4 Progress

# References


[1] Simon A. Forbes, David Beare, Harry Boutselakis, Sally Bamford, Nidhi Bindal, John Tate, Charlotte G. Cole, Sari Ward, Elisabeth Dawson, Laura Ponting, Raymund Stefancsik, Bhavana Harsha, Chai Yin Kok, Mingming Jia, Harry Jubb, Zbyslaw Sondka, Sam Thompson, Tisham De, and Peter J. Campbell. COSMIC: somatic cancer genetics at high-resolution. *Nucleic Acids Research*, 45(D1):D777–D783, jan 2017.

[2] Mark F. Rogers, Hashem A. Shihab, Tom R. Gaunt, and Colin Campbell. CScape: a tool for predicting oncogenic single-point mutations in the cancer genome. *Scientific Reports*, 7(1):11597, dec 2017.

[3] Christian Widmer, Marius Kloft, Vipin T Sreedharan, and Gunnar Rätsch. Framework for Multi-task Multiple Kernel Learning and Applications in Genome Analysis. jun 2015.