# IMAGE INFORMATICS APPROACHES TO ADVANCE CANCER DRUG DISCOVERY

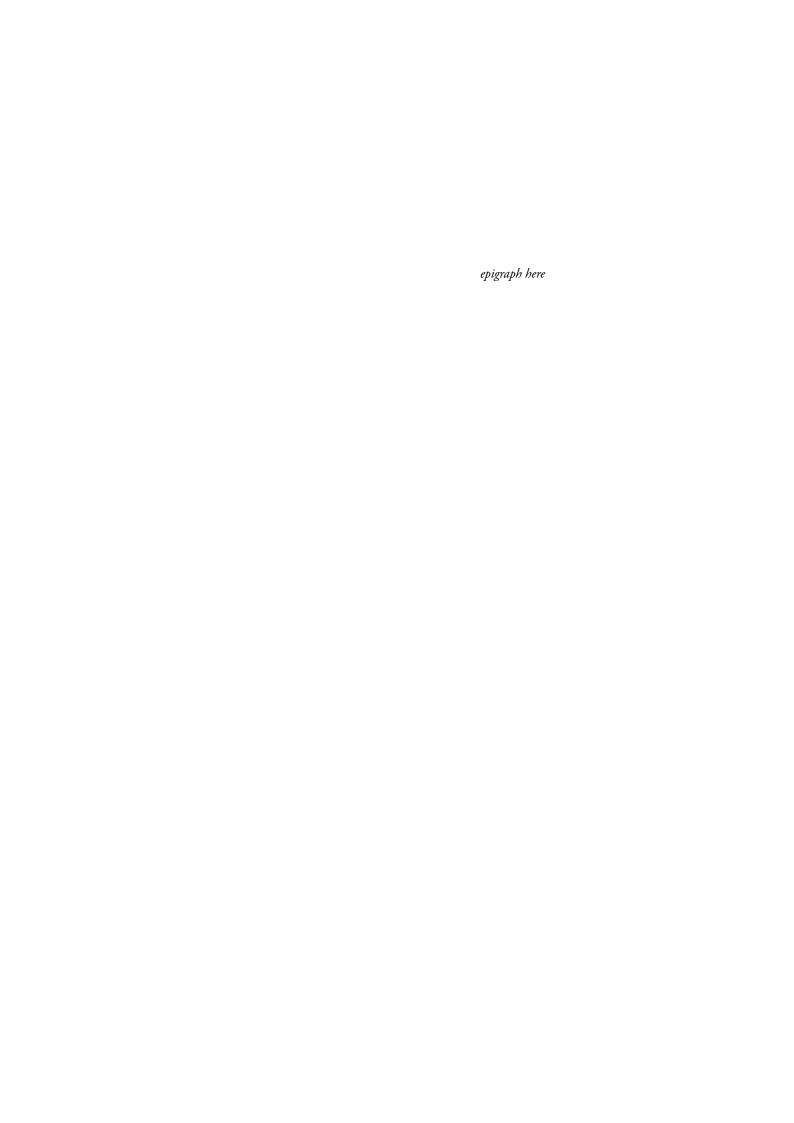
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#### **DECLARATION**

This thesis presents my own work, and has not been submitted for any other degree or professional qualification. Wherever results were obtained in collaboration with others, I have clearly stated it in the text. Any information derived from the published work of others has been cited in the text, and a complete list of references can be found in the bibliography. Published papers arising from the work described in this thesis can be found in the appendices.

- Scott Warchal, 2018



# **ACKNOWLEDGEMENTS**

Acknowledgements here.

#### **ABSTRACT**

Abstract here.

### LAY SUMMARY

Lay summary here.

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#### LIST OF ACRONYMS

- 2D Two-dimensional
- **3D** Three-dimensional
- PBS Phosphate buffered saline
- DMSO Dimethyl sulfoxide

# INTRODUCTION

#### 1.1 Eroom's Law: The increasing cost of drug discovery

Throughout the last 70 years the cost of developing a new drug has steadily increased. Scannel *et al.* observed that the cost to develop a new drug has approximately doubled every 9 years<sup>1</sup>. This observation has been dubbed "Eroom's law", a homage to Moore's law – an observation that the number of transistors in microprocessors approximately doubles every 2 years. The cost of bringing a new drug to market is now approaching £1 billion, taking 10 years from initial concept to approval, the reasons behind this every-increasing cost are multi-faceted. One explanation may be that the low-hanging fruit has been taken, effective long-standing remedies have been studied and commercialised, natural products screened, and we are now tackling the more complex diseases and pharmacological targets.

#### 1.2 Phenotypic Screening

- define phenotypic screening
- how it differs from target-based screening
- why there is a resurgence in phenotypic drug discovery
- · benefits, downfalls

#### 1.2.1 High Content Imaging

- define, multiparametric etc.
- historic success stories
- · high-content profiling

# 2 | CHAPTER NAME

#### 2.1 Section name

Stuff here, text text text text citation<sup>2</sup>.

#### **BIBLIOGRAPHY**

- [1] Jack W Scannell, Alex Blanckley, Helen Boldon, and Brian Warrington. "Diagnosing the decline in pharmaceutical R&D efficiency". *Nature Reviews Drug Discovery* 11.March (2012), pp. 191–200.
- [2] Mi Yang, Jaak Simm, Pooya Zakeri, Yves Moreau, and Julio Saez-Rodriguez. "Linking drug target and pathway activation for effective precision therapy using multi-task learning". *bioRxiv* (2018), p. 225573.