## Manuscript plan

## Motivation and Background

#### ${\bf Chapter 1: Introduction}$

- 1.1 General problem statement
- 1.2 Technical approach
- 1.3 Thesis overview
- 1.4 Key Contributions
- 1.5 Software
- 1.6 Ethics

#### Chapter 2: Background

- 2.1 Introduction
- 2.2 Breast anatomy
- 2.3 Breast imaging
- 2.4 Breast compression
- 2.5 Conclusion

#### Part 2: Biomechanical breast model

#### Chapter 3: Background and state of the art

- 3.1 Introduction
- 2.5 Continuous mechanics
- 2.6 Finite elements theory
- 3.6 Finite elements models: overview
- 3.7 Conclusion

## Chapter 4: Patient specific breast geometry and Finite element mesh

- 4.1 Introduction
- 4.2 Data acquisition
- 4.3 Image registration
- 4.4 Image segmentation
- 4.5 Model generation
- 4.6 Conclusion

#### Chapter 5: Breast mechanics modeling

- 5.1 Introduction
- 5.2 Biomechanical properties of breast tissues
- 5.3 Boundary conditions
- 5.4 Stress-Free configuration
- 5.5 Conclusion.

#### Chapter6: Biomechanical breast model validation

- 6.1 Introduction
- 6.2 Validation process
- 6.3 Breast deformation under gravity loads
- 6.4 Discussions
- 6.5 Conclusion

### Part 3: Breast compression in digital mammography

#### Chapter 7: Background

- 7.1 Problem statement
- 7.2 Image acquisition chain simulation

#### Chapter 8: Breast deformation under compression

- 8.1 Introduction
- 8.1 State of the art
- 8.2 Compression paddle models
- 8.3 Contact surface modeling
- 8.4 Breast deformation under compression
- 8.5 Discussions
- 8.6 Conclusion

#### Chapter 9: Measures of compression quality

- 9.1 Introduction
- 9.2 Image quality
- 9.4 Breast dose
- 9.5 Patient comfort
- 9.6 Conclusion

# Chapter 10: Comparison of compression with different paddles geometry

- 10.1 Introduction
- 10.2 Gold standards
- 10.3 Compression quality
- 10.4 Discussions
- 10.5 Conclusion

#### Part 4: Thesis review

#### Chapter 11: General conclusion and perspectives

- 11.1 Conclusion
- 11.2 Perspectives