DOCTORAL CANDIDATE:	Bartłomiej Siwek
DEGREE:	Philosophiae Doctor
FACULTY:	Det matematisk-naturvitenskapelige fakultet
DEPARTMENT:	Institutt for informatikk
AREA OF EXPERTISE:	Computational geometry
SUPERVISORS:	Knut Mørken, Martin Reimers, Michael Floater
DATE OF DISPUTATION:	23rd of October 2015

DISSERTATION TITLE: *Discrete methods for splines and subdivision curves*

Good computer-aided design and computer-aided manufacturing (CAD/CAM) software is important in today's engineering and design. At the hearth of it are computational methods for splines and subdivision. It is therefore very important to develop and improve those methods. This topic is the main focus of the PhD thesis.

Chebyshev Spline is very important mathematical object due to its use in many spline applications, thus the ability to find it efficiently is crucial. Chapter 2 of the thesis contains rigorous proof and analysis of the algorithm most commonly used for this purpose. This confirms that the method is indeed correct and efficient.
It is equally important to improve the existing methods by making them more suited for the computer. Chapter 3 of the thesis proposes a discrete version of the algorithm from chapter 2 and analyses its properties.

Subdivision curves and surfaces are of great importance to both engineers and designers. It is very important to develop new subdivision schemes and prove additional properties of the existing ones. Chapter 5 and 6 apply an innovative method of analysis to a Hermite curve subdivision scheme and show its properties on both regular and semi-regular grids of points.

Splines are sometimes used together with the tight wavelet frame systems. This particular combination is used in image restoration process called inpainting, which chapter 3 adapts for use on three dimensional images using the graphics processor (GPU). This method can potentially be used for artifact removal and denoising in videos and medical images.