

# ITC Research Student Seminar 2015-16

**Date:** 21 March 2016 (Monday)

**Time:** 2:30 pm – 4pm

**Venue:** Room MN109, The Hong Kong Polytechnic University

**Speaker:** Cheung Chun Ting (MPhil Student)

**Topic:** 3D Shape Knitting: Loop Alignment on a Surface with Positive Gaussian Curvature

**Speaker:** Jia Yuanning (MPhil Student)

**Topic:** Impact of Public Environmental Investment on Public Health-A comparison between P.R.C. and U.S.A.

**Speaker:** Lu Lu (PhD Student)

**Topic:** Development of an Adaptive Corset for Children with Spinal Deformities

**Speaker:** Yao Mei Yu (PhD Student)

**Topic:** A Pilot Study on the Possibility of Finger Knitting as a Therapy

## Abstracts

**Topic:** 3D Shape Knitting: Loop Alignment on a Surface with Positive Gaussian Curvature

This research aims at manipulating loop alignment in knitting a three-dimensional (3D) shape by its geometry. Two loop alignment methods are introduced to handle a surface with positive Gaussian curvature. As weft knitting is a two-dimensional (2D) knitting mechanism that the knitting cam carrying the feeders moves in two directions only, left and right, the knitted fabric generated grows in width and length but not in depth. Therefore, a 3D

shape is required to be flattened to a 2D plane with surface area preserved for knitting. On this flattened plane, dimensional measurements are taken for loop alignment. The way these measurements being taken derived two different loop alignment methods. In this paper, only plain knitted structure was considered. Each knitted loop was taken as a basic unit for loop alignment in order to achieve the required geometric dimensions, without the inclusion of other stitches which give textural dimensions to the fabric. Two loop alignment methods were experimented and compared. Only one of these two can successfully preserve the dimensions of the shape.

**Topic:** Impact of Public Environmental Investment on Public Health-A comparison between P.R.C.and U.S.A.

Impact of Public Environmental Investment on Public Health-A comparison between P.R.C.and U.S.A. Submitted by Yuanning Jia for the degree of MPhil at The Hong Kong Polytechnic University.

Rapid development brings about enormous benefits at the cost of damaging the environment and creates substantial unhealthy material, such as life waste water, industrial emission or vehicle exhaust, making human's health and environment pollution to be two inescapable factors interrelating each other. It has become an increasingly serious problem that human beings are facing now days. The health effects of pollution imperil human lives. This fact is well-documented.The unaccountable quantity of pathogens, plankton and microbial have create by deteriorating environmental pollution. In order to treat diseases, human beings are not only need to recognize human development and history of health and disease, and also need to know the relationship between health and environmental pollution. Do not recognize the relationship, people cannot understand the health historically, and also do not know how to treat the disease.

In this project, the investigation focuses on P.R.C. and U.S.A. The former is a developing country and the latter is a developed country. In order to explore the impact of environmental investment on public health in these two countries.

**Topic:** Development of an Adaptive Corset for Children with Spinal Deformities

Three-dimensional deformity of the spine (or scoliosis) is a musculoskeletal disorder that affects between 1.5% and 3% of the population. Curve

progression is more likely to occur when growth potential is high. The orthotic treatment is generally prescribed according to the patient's Cobb's angle and bone maturity. Severe spinal deformity can greatly reduce pulmonary and cardiac functions which may lead to death from cardiopulmonary failure. Nonsurgery treatment such as a spinal brace made of thermoplastic materials has been and remains an important treatment for scoliosis patients with the curve of 20-45°. To prescribe an adaptive corset that could provide optimal interface pressure and corrective force to control the progression of spinal deformities, a thorough biomechanical assessment must be undertaken. In this study, precise anthropometry measurements and morphologies of the torso were safely and efficiently extracted by using a 3D body scanner. To be effective, the brace must be worn for 23 hours a day until the child has completed growth. Therefore, in order to improve the wearing comfort and increase the compliance, carbon fiber and fiber glass were proposed and evaluated. Both 3D anthropometry analysis and material evaluation provide a foundation for the optimal corset design for spine support.

**Topic:** A Pilot Study on the Possibility of Finger Knitting as a Therapy

Recently, mental health is being emphasized as it is highly related to people's quality of life and potentially long-term disability and even mortality. Nevertheless, supports to people who have mental health problem are insufficient and the effectiveness current psychotherapies are doubtful. This study thus proposes a unique finger knitting method to alleviate mental health problem and provide evidences on the relationship between finger knitting, personal growth and mental health. 4-sessions finger knitting workshops are carried out in small groups to observe the potential changes of the participants. Participants were appreciated and satisfied with the workshops and found it helpful and meaningful. Their opinions and improvements were recorded by informal interview, observations and questionnaire. It is found that the advantages of finger knitting are huge, such as promote active lifestyle and distract sad thoughts, and it alters the traditional concepts of knitting, which is an old-fashion and unattractive domestic work. Hence, it is recommended that further investigation on finger knitting and its possibility as a kind of therapy should be carried out.

**~All are welcome~**