Projects offer by Plastics Injection Molding Center at the German University in Cairo (GUC), Egypt 2018

The below topics are available at Plastics Injection Molding Center at GUC, Egypt. Interested students can contact Eng. Ahmed Galal, Director of Plastic Center (PIMC) (ahmed.seileem@guc.edu.eg) or Dr. Anke Klingner, GUC (English or German, anke.klingner@guc.edu.eg). Attention: Students will have to find another professor at the University of Stuttgart to accept the work at the University of Stuttgart.

1. **Design of mold inlet for plastic testing specimen at PIMC, GUC (up to 2 students)**

   Specimen for materials testing such as dielectric spectroscopy and rheology need special dimensions which are aimed to be produced by injection molding. Therefore, the task is to design a mold inlet using software such as proengineer, mold-flow, plastics work and solidworks. Challenges will be the optimal arrangement and number of specimen in the mold inlet, position and size of inlet gate, simulation for different polymers and processing conditions such as pressure, injection speed and temperatures. After the simulation and optimization of the mold inlet it should be fabricated and pieces should be produced. The work will be performed in close cooperation with the Plastics Injection Molding Center at GUC.

2. **Blending of virgin and recycled polymers at PIMC, GUC and materials characterization (up to 2 students)**

   Recycling of used polymers is an important contribution to waste reduction. Here, specimens will be produced by injection molding which have a different percentage of recycled polymer. Then, the properties of the specimens will be characterized to see if they are still suitable for usage. The main characterization will be tensile tests. Eventually, injection molding parameters will have to be modified. Simulations using software such as proengineer, mold-flow, plastics work and solidworks could complete the work. The work will be performed in close cooperation with the Plastics Injection Molding Center at GUC.

3. **Mixing of polymers with fillers at PIMC, GUC and materials characterization (up to 2 students)**

   Recycling of used polymers is an important contribution to waste reduction. Here, specimens will be produced by injection molding which have a different percentage of fillers. Then, the properties of the specimens will be characterized to see if they are still suitable for usage. The main characterization will be tensile tests and rheology. Eventually, injection molding parameters will have to be modified. Simulations using software such as proengineer, mold-flow, plastics work and solidworks could complete the work. The work will be performed in close cooperation with the Plastics Injection Molding Center at GUC.

4. **Optimizing cycle time and production conditions of injection molding machine for food product container (1 student)**

   Injection molding is used to produce food bowls with an existing mold inlet at Plastics Injection Molding Center at GUC. The aim is to optimize cycle time and product quality using software such as proengineer, mold-flow, plastics work and solidworks. Challenges will be the simulation for
different polymers and processing conditions such as pressure, injection speed and temperatures. After the simulation and optimization some food bowls should be fabricated, tested and compared to the simulation. Research should be done for the condition to achieve Food Approval certificate FDA. The work will be performed in close cooperation with the Plastics Injection Molding Center at GUC.

5. **Applying NC5 Sumitomo Demag software to prepare program sequence for advanced mold (up to 2 students)**

Some plastic pieces with complicated structures cannot be produced with simple inlet molds for injection molding. Then, advanced molds with moveable pieces (hydraulic core pulls) have to be used. These advanced molds use hydraulic core pulls need precise timing and order for any movement. This sequence for the injection process will be programmed using NC5 Sumitomo Demag software. The work will be performed in close cooperation with the Plastics Injection Molding Center at GUC.

6. **Programing CNC turning machines using Heidenhein and Siemens control (up to 2 students)**

Most CNC machines use either Heidenhein or Siemens control system. Here, the student will program and see the application at the CNC machine. The work will be performed in close cooperation with the Industrial Park at GUC.

7. **Programing CNC milling machines using Heidenhein and Siemens control (up to 2 students)**

Most CNC machines use either Heidenhein or Siemens control system. Here, the student will program and see the application at the CNC machine. The work will be performed in close cooperation with the Industrial Park at GUC.

8. **Applying CMM ARCOCAD SOFTWARE to increase quality of manufactured parts (up to 2 students)**

CMM Qi machine in the Industrial Park at GUC is used to measure dimensions of manufactured parts with 1μm accuracy. The manufactured parts can have dimensions up to 60 cm. The control software CMM ARCOCAD will be applied to increase the quality of manufactured parts. The dimensions of produced pieces will be measured and compared with the aimed dimensions. In case of major deviations, the programming of CNT machines will be modified to decrease deviations. The work will be performed in close cooperation with the Industrial Park at GUC.

9. **Applying CNC flexible production technique and industry 4 to maximize productivity of CNC machines (up to 2 students)**

Production rate at many companies is low because of human feeding of raw materials, manual fixation of pieces etc. Industry 4 aims to increase productivity by reducing human interaction and automation of transfer of pieces from one machine to the next. Here, the productivity of CNC machine should be increased by creation of automated input and output of pieces for CNC machine. This setup should be designed, constructed and programmed. The work will be performed in close cooperation with the Industrial Park at GUC.