Interview Assessment 1

Name of Professional: Radovan Kovacevic

Profession/Title: Director of Research Center for Advanced Manufacturing and Center for Laser-Aided Manufacturing

Business/Company name: SMU Lyle School of Engineering

Date of Interview: October 18th, 2017

Assessment:

Earlier this week on October 18th, 2017, I sat down with Dr. Kovacevic, the Director of Research Center for Advanced Manufacturing and Center for Laser-Aided Manufacturing. Prior to this interview, I had prepared several questions pertaining to the field of engineering but more specifically questions pertaining to developments in additive manufacturing techniques, CNC machines, and 3D printing. Upon arriving at the interview I was greeted with a friendly handshake and introduction by Dr. Kovacevic himself. He then proceeded to bring me into his office in the basement of the building where the research center was also located. In his office, we proceeded with the interview with me asking him the questions I had prepared which related to my field of study. During the interview he explained how his research mainly dealt with additive manufacturing but more specifically the laser-aided side of additive manufacturing as opposed to the 3D printing side I was interesting. While this was not exactly related to my topic, it still applied to the field of CNC machines and additive manufacturing while also piquing my interest in this new field of laser-aided manufacturing which I had not done much research on. Dr. Kovacevic also gave me a tour of the research center and explained each type of machinery they had on-site. The research center had various laser-related machines which utilized fiber

optics in order to direct the laser from its source to the cutter itself. There were three laser cutters which they utilized at the research center: one was a disk laser, typically used for fusing and cutting parts; and two were diode lasers of different sizes; one used for cladding parts with metal, and one for manufacturing complex shapes. One of these complex shapes involved using stainless steel and inconel, an alloy of nickel and chromium, and when heated, could shrink rather than expand. These lasers ranged from 4 kW to 20 kW and created parts by melting extremely fine metal powder at as high temperatures as 1200℃ onto existing metal. By working at these temperatures and with such a focused beam, the metal would cool quickly, allowing seemingly impossible shapes to be created even at high speeds. Around the center there were also stress testing machines for measuring the strength of manufactured parts as well as friction welders, and water cutters; used for testing the erosion properties of parts.

Dr. Kovacevic also introduced me to some of his coworkers and co-researchers also working in the RCAM (research center for additive manufacturing). One of which included a visiting research fellow named Hongxiao Wang who was working for the CRH (China Railway High-Speed) in China. Dr. Wang explained how the recent developments in the field of mechanical engineering such as lasers have allowed train carriages to be manufactured with much more ease than ever before. Laser welding and CNC milling machines were used in conjunction in order to manufacture train carriages cheaply and efficiently. Dr. Wang also explained how laser welded parts could be seamless on one side and could be stronger than traditional spot welding or arc welding. Another coworker Dr. Kovacevic introduced me to was Dr. Makbari, who was working on projects pertaining to the field of 3D printing. He explained how CAD modeling and rapid prototyping could be used together to revise a product quickly, or

to manufacture products in small quantities economically as opposed to traditional manufacturing techniques. Dr. Makbari also explained how 3D laser scanners were rapidly improvin and handheld ones could get as accurate as 1 mm while stationary scanners could be as accurate as 0.1 mm. However, he also explained several drawbacks with scanners. Such drawbacks included how sharp edges or overhangs could not be modeled as accurately as manually but were still much more convenient. Dr. Makbari also elaborated on how the 3D scanned models could be placed into reverse engineering software in order to form a solid CAD model which could be manufactured using CNC machines. He also offered his services and resources for when and if I would need to create a final product which could possibly involve additive manufacturing.

Overall, the information I gained from this interview and encounters with the various researchers working at the center were able to effectively corroborate the research I had done on my topic. The information presented also expanded upon it, bringing to light new manufacturing techniques I had not known about prior to meeting with Dr. Kovacevic while also explaining the various applications of these techniques. As my ISM journey continues, I look forward to possibly meeting again with Dr. Kovacevic, and possibly for when I need to create my final product. I also plan to continue to meet with other professionals in this field and continue to apply my research to these interviews.