

Interview Assessment 4

Name of Professional: Tae-Youl Choi

Profession/Title: Associate Professor of Mechanical and Energy Engineering

Business/Company name: UNT

Date of Interview: November 6th, 2017

Assessment:

This past month, I was able to meet with Dr. Choi, the associate professor of mechanical and energy engineering at UNT. I had reached out to Dr. Choi after searching for mechanical engineers working on projects related to my topic of additive manufacturing. Prior to this interview, I had prepared several questions which I wanted to ask about mechanical engineering as a whole but more specifically about 3D printing and CNC machining. Going into this interview, I mainly wanted to learn more about the applications and uses of such manufacturing processes.

Starting off, Dr. Choi and I discussed some of his work which included working with various types of 3D printer filament used in FDM printers. Dr. Choi explained how most of his research dealt with thermal fluid science as well as thermodynamics; aspects which he wanted to improve upon in current FDM filaments. He explained how he was experimenting with carbon nanotubes as well as other forms of nano-materials which could be added to 3D printer filaments in order to strengthen their thermal, mechanical, and optical properties. With the nano-materials, new possibilities and applications were now available to the realm of 3D printing which included the creation of sensors, medical applications, as well as several applications for spacecraft. With the carbon nanotubes radiation could be blocked which was especially useful for space travel.

During the interview we also discussed the various different types of 3D printers such as FDM printers and SLA or resin printers. He explained how with FDM printing the machine would melt plastic and deposit them in layers, forming the completed model. He said how the resolution of FDM printers could only be as accurate as 200-300 microns, a number which differed significantly from my research which stated how FDM printers were achieving resolutions of as accurate as 100 microns. Dr. Choi also explained how SLA or resin printers created models layer-by-layer as well, but with the model being created upside down as each layer was cast using UV light to solidify the resin. He also said how SLA printers were significantly more accurate than FDM printers; being able to achieve resolutions of as high as 16 microns while also explaining how he had to use both types of 3D printer as well as metal 3D printers on a daily basis. While Dr. Choi did not elaborate as much on the metal 3D printing as Dr. Kovacevic had from my first interview, he did explain thoroughly the processes behind FDM and SLA printing as well as the work he was doing with each. Dr. Choi explained how he often used 3D printing for rapid prototyping, being very advantageous as it allows engineers to make rapid modifications and produce a physical model of a design quickly. This confirmed what many of my other interviewees had said about the 3D printing field as well.

Throughout the interview, we also discussed the future of 3D printing. Dr. Choi explained how the bulk of his research was focused on improving 3D printing as a whole such as in his research with improving the filaments involved with FDM printing as well as the machines themselves. He explained how many of his students were working on actually building 3D printers using kits as well as online tutorials. He also explained how the trend of 3D printing was also very popular with consumers, but often consumer 3D printers had low resolution or detail.

He explained how home 3D printing, while the cost could be low, had little useful applications when compared to industrial 3D printing which even had medical applications. He did, however, say how the popularity of 3D printing was growing and would gain importance in the mechanical engineering field.

Overall, from this interview, I learned quite a bit about the various applications of 3D printing rather than just the future of 3D printing in mechanical engineering as I had learned from my past interviews. While I did learn about many of the applications of FDM printing and SLA printing, I did not learn as much about CNC machining as I had hoped. I still had several questions about the process of CNC milling and CNC machining which I will have to focus more on in future interviews. From this interview I still gained a thorough insight into the broader field of mechanical engineering such as what forms of education are needed for the career field as well as what the future holds for 3D printing and rapid prototyping. For future interviews, I will hope to apply this information as well as find more professionals working more closely in the field of 3D printing and CNC machining rather than the broad field of mechanical engineering.