CHARACTERIZING THE QUALITY OF 3D PRINTED PARTS USING SPATIOTEMPORAL DATA ANALYSIS

By Erika Melder

Mentor: Weihong (Grace) Guo

STATEMENT OF THE PROBLEM

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  - **POROSITY**
  - WARPING
  - DIMENSIONAL INACCURACY
- WE WOULD LIKE TO **DETECT** THESE DEFECTS **BEFORE WE FINISH PRINTING**, TO TRY AND CORRECT THE PRINTING JOB DYNAMICALLY.

THE DATA

- An Optomex LENS 750 system was equipped with a pyrometer aimed at the melt pool, and an infrared camera in the print chamber.

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- The system printed a thin wall out of Ti-6Al-4V.

- The pyrometer and IR camera feeds were captured as pixel color matrices at each time step.
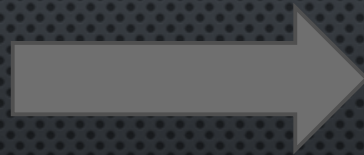
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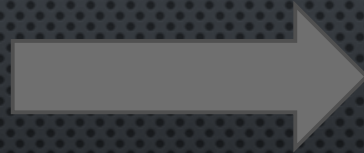- Infrared camera: video feed of print stage

OUTPUT

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We want to analyze the process **as it happens**, so we can stop printing, send new instructions to the printer and **correct the part automatically**.

PAST RESEARCH

- Characterize the part quality based on the **MORPHOLOGY** of the melt pool

PAST RESEARCH

- CHARACTERIZE THE PART QUALITY BASED ON THE **MORPHOLOGY** OF THE MELT POOL

- CHARACTERIZE THE PART QUALITY BASED ON THE **THERMAL DISTRIBUTION** OF THE MELT POOL

POTENTIAL TOPICS OF EXPLORATION

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- TRAIN A NEURAL NETWORK TO CHARACTERIZE POTENTIAL PROBLEMS

ACKNOWLEDGEMENTS

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