



Master Thesis: “Homogeneity Control in Powder Bed Fusion - Electron Beam”

Introduction: The future of additive manufacturing shines brightly with the potential to revolutionize the production of high-quality metal parts. At the heart of this innovation is the powder bed electron beam melting (PBF-EB) process, known for its precision and versatility. Due to the static charge of the powder during exposure, the powder must be pre-sintered to avoid dust formation. Ensuring the pre-sintering quality of powder layers is a huge challenge and directly influences the success of the manufacturing process. This master project, guided by the Chair of Materials for Additive Manufacturing at the University of Wuppertal, seeks to unravel this challenge by employing various process monitoring techniques to control and evaluate pre-sintering with different process parameters and ensure the highest quality for parts in PBF-EB.

Your Role:

- Execute sophisticated experiments using a variety of monitoring techniques, enhanced by Python scripting for data analysis and visualization.
- Engage in deep statistical analysis to draw meaningful correlations between process conditions and the final mechanical properties of manufactured parts.
- Collaborate with a team of dedicated researchers and peers in a quest to push the boundaries of additive manufacturing technology.

What We're Looking For:

- Studies in mechanical engineering, or a related field, with a keen interest in additive manufacturing.
- Experience in Python, or a desire to learn and apply this skill.
- Initiative, creativity, and the ability to work both independently and as part of a dynamic research team.
- Good communication skills in English and a commitment to contributing to groundbreaking research.
- Completion of the “Additive Manufacturing” and “Advanced Topics of Additive Manufacturing” modules is recommended but not mandatory

What You'll Gain:

- Completed an advanced project in your portfolio.
- Mentorship from leading experts in the field of additive manufacturing.
- Hands-on experience with state-of-the-art technology and research methodologies.
- Access to state-of-the-art facilities and the freedom to explore and implement your ideas.

Apply Now: Dive into the fascinating world of additive manufacturing research and take part in shaping the future. We are looking forward to receiving your application:

Ivan Zhirnov PhD.

Chair of Materials Science and Additive Manufacturing,
School of Mechanical Engineering and Safety Engineering,
Gaußstraße 20, 52074 Wuppertal.

zhirnov@uni-wuppertal.de.

Discover more about our work at www.mam.uni-wuppertal.de.

Master Thesis: “Understanding Defect Healing in Powder Bed Electron Beam Melting: A Data Fusion Approach”

Introduction: The quest for perfection in additive manufacturing leads us to the intricate study of defect healing within the powder bed electron beam melting (PBF-EB) process. As we strive for the pinnacle of part quality and performance, understanding and mitigating defects is paramount. This project, under the auspices of the University of Wuppertal's Chair of Materials for Additive Manufacturing, aims to pioneer a data fusion approach to thoroughly comprehend and address defect healing in PBF-EB, leveraging a myriad of process monitoring data generated by adjusting parameters and process strategies.

Your Role:

- Engage in a detailed analysis of defect formation and healing processes across multiple PBF-EB builds by running advanced research equipment and testbeds.
- Harness the power of machine learning and statistical analysis, using Python and other data science tools, to classify defects and predict their impact on final part quality.
- Collaborate with a team of motivated researchers, sharing your findings and contributing to the development of predictive models for quality assurance in additive manufacturing.

What We're Looking For:

- Studies in engineering, materials science, or a closely related discipline.
- Experience in Python programming, or a desire to learn and solve complex analytical problems.
- An analytical mindset with a tendency for detail-oriented research and experimentation.
- Excellent teamwork and communication skills, with fluency in English.
- Completion of the “Additive Manufacturing” and “Advanced Topics of Additive Manufacturing” modules is recommended but not mandatory

What You'll Gain:

- Completed an advanced project for your portfolio in applying data science and machine learning to enhance manufacturing processes.
- A supportive research environment that values innovation and encourages the exploration of new ideas and technologies.
- Direct mentorship from experts and the opportunity to work on cutting-edge research projects.

Apply Now: Dive into the fascinating world of additive manufacturing research and take part in shaping the future. We are looking forward to receiving your application:

Ivan Zhirnov PhD.

Chair of Materials Science and Additive Manufacturing,
School of Mechanical Engineering and Safety Engineering,
Gaußstraße 20, 52074 Wuppertal.

zhirnov@uni-wuppertal.de.

Discover more about our work at www.mam.uni-wuppertal.de.