#### Universität Stuttgart Institut für Technische und Numerische Mechanik

Yulong Gao

Investigation on the Dynamic Behavior of Paintings During Transport: Experimentation, Simulation and Modeling





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### Investigation on the Dynamic Behavior of Paintings During Transport: Experimentation, Simulation and Modeling

Von der Fakultät Konstruktions-, Produktions- und Fahrzeugtechnik der Universität Stuttgart zur Erlangung der Würde eines Doktor-Ingenieurs (Dr.-Ing.) genehmigte Abhandlung

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#### **Preface**

This dissertation marks the culmination of five transformative years spent as a dedicated researcher at the Institute of Engineering and Computational Mechanics (ITM) at the University of Stuttgart. During this time, I have had the profound honor of immersing myself in the study of the dynamic characteristics of paintings, an endeavor that has not only expanded my intellectual horizons but also enriched my life in countless ways.

Reflecting on these years, I am filled with deep gratitude for the incredible atmosphere at ITM. The collaborative spirit and the serene environment here have allowed me to grow, not just as a researcher, but as a person. My journey has been one of continuous learning, marked by moments of profound insight and personal growth. To everyone who has crossed my path during this period, offering wisdom and support, I extend my heartfelt thanks.

First and foremost, I am deeply indebted to my doctoral advisor, Prof. Peter Eberhard. From our very first conversation, I felt a sense of destiny guiding me to Germany and to his esteemed tutelage. His unwavering support, insightful guidance, and boundless patience have been the bedrock of my research. Prof. Eberhard, your encouragement and understanding, especially during times of error and doubt, have been invaluable. Your trust in granting me the freedom to explore has allowed me to flourish as a researcher. I am profoundly grateful for the opportunity to be a part of your research group and for the myriad ways you have influenced my scientific and personal journey.

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To my colleagues and friends at ITM, thank you for creating a nurturing and inclusive environment. Your advice and camaraderie have been sources of inspiration and joy, making this journey a collective achievement. I am also grateful to the students I have supervised over the years. Our interactions have sparked many eureka moments and deepened my own understanding of our work. To Prof. Peter and my co-examiners, I appreciate your commitment and thoroughness in reviewing my research, which has elevated the quality of this dissertation.

My deepest thanks go to my family in China. Your unwavering support and understanding have been my anchor throughout this journey. Without your encouragement, this work would not have been possible.

Lastly, I want to acknowledge myself. Navigating five years in a foreign land, amidst challenges and uncertainties, has been a testament to my resilience and inner strength. Despite the occasional cloudy skies, I have emerged more emotionally grounded and determined. As I look ahead to the unknown, I am confident in my ability to face future challenges with the same resolve and inner fortitude.

Stuttgart, July 2024

Yulong Gao

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