

Simulation of Contrast Agent and Blood Flow Integration in Neurosurgery Based on the SPH Method

Project Description: As neurosurgical techniques continue to advance, relying solely on the accumulation of clinical experience is no longer sufficient to meet the increasing demands for precision in surgery. The integration of medical and engineering disciplines has opened new avenues for surgical advancements. This project is dedicated to developing a simulation model for neurosurgical procedures using the Smoothed Particle Hydrodynamics (SPH) method. The model focuses on simulating the interaction between contrast agents and blood flow during cerebrovascular surgeries, aiming to enhance the accuracy and safety of these procedures. Through real-time computer simulations, we aim to provide surgeons with more precise surgical guidance and initially realize precise control over injection speed, needle depth, and dosage during the injection of contrast agents, thereby reducing operative risks and improving treatment outcomes.

Job Description: We are seeking a well-grounded, self-driven Research Assistant with an interest in neurosurgical simulation models and a willingness to conduct research in this field. The ideal candidate should have a background in biomedical engineering, fluid dynamics, or a related field, with a deep understanding of the Smoothed Particle Hydrodynamics (SPH) method and its applications in the medical field. Key responsibilities include assisting in the development and optimization of a simulation model for cerebrovascular surgeries, conducting simulation analyses of the interaction between contrast agents and blood flow, and participating in laboratory experiments to validate the model's accuracy. The candidate will have the opportunity to collaborate closely with a multidisciplinary team and publish academic papers on this project in renowned journals. Participation in this cutting-edge medical engineering project will provide invaluable research experience, laying a solid foundation for future advanced degree applications or a career in the field of medical engineering.

This position commences in or after early 2024, with individuals anticipated to initiate their responsibilities no later than Spring 2024. The term of employment spans two years, and the contract is structured for annual renewal.

Qualifications:

- Bachelor's or higher degree in Biomedical Engineering, Fluid Dynamics, or related fields, or background in simulation technologies, medical imaging processing, computational fluid dynamics.
- Experience in design, simulation, and experimental validation of Smoothed Particle Hydrodynamics (SPH) simulation techniques.
- Proficiency in coding, using simulation software, and data analysis tools (such as Python, C, and related software like MATLAB, ANSYS Fluent).

For questions regarding this position, please contact Dr. Yue Qiu, at qiuyue@wchscu.cn.