

基于 SPH 方法的神经外科造影剂与血流积分模拟

【项目描述】：随着神经外科技术的不断进步，只依赖临床经验的积累已经无法满足更高的手术精确度需求，医工结合为手术的进步打开了新的思路。本项目旨在利用平滑粒子流体动力学（SPH）方法，开发一个用于神经外科手术的仿真模型。该模型专注于模拟造影剂和血流在脑血管手术中的交互作用，旨在提高手术的精度与安全性。通过实时计算机模拟，我们期望能够为外科医生提供更准确的手术引导，初步实现对造影剂注射过程中，注射速度、针头深度、注射计量的精确控制，减少手术风险，提高治疗效果。

【职位概述】：我们正在寻求一位基础扎实、自我驱动，对神经外科仿真模型感兴趣，并愿意在此领域开展研究工作的科研助理。理想的候选人应具有生物医学工程、流体动力学或相关领域的专业背景，对平滑粒子流体动力学（SPH）方法及其在医疗领域的应用有深入理解。该职位的主要职责包括协助开发和优化针对脑血管手术的仿真模型，进行造影剂与血流交互作用的仿真分析，以及参与实验室实验来验证模型的准确性。候选人将有机会与多学科团队紧密合作，并在知名期刊上发表关于该项目的学术论文。通过参与这一前沿的医学工程项目，候选人将获得宝贵的研究经验，为未来申请更高学位或在医疗工程领域的职业生涯打下坚实的基础。

【职位要求】：

- 生物医学工程、流体动力学或相关专业的学士及以上学历，或仿真技术、医学影像处理、计算流体动力学等相关背景。
- 平滑粒子流体动力学（SPH）仿真技术的设计、仿真及实验验证相关经历。
- 熟练代码编写、仿真软件使用和数据分析工具使用（如 Python、C，以及相关软件如 MATLAB、ANSYS Fluent）。

有关此职位的问题，请联系邱越博士，电子邮件：qiuyue@wchscu.cn

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.