Yiyi WEI

yiyi511@gmail.com

Geometrica Team
INRIA Sophia Antipolis - Méditerranée
2004, route des Lucioles - BP 93
06902 Sophia Antipolis - FRANCE
+33 6 76 24 01 22

LIAMA - CASIA
Room 712, Automation Building
95 Zhongguancun East Road
100190 Beijing - CHINA
+86 138 1001 8045

EDUCATION

co-tutorial Ph.D (2012)
Université de Lille 1 Sciences et Technologies (***USTL***), FRANCE
Institute of Automation, Chinese Academy of Sciences (***CASIA***), CHINA

Thesis — ***Toward real-time simulation of aneurysm coil embolization using the discrete exterior calculus method***

A new numerical approach, Discrete Exterior Calculus (DEC), along with its practical implementation, is first introduced into hemodynamic simulation. Relying on this new approach, toward real-time simulation of blood flow and blood-structure interaction is achieved in specific applications, such as coil embolization of aneurysm.

Advisors — Prof. Stéphane COTIN (INRIA), Prof. Songde MA (CASIA)

B.E. (2006)
Beihang University (***BUAA***), CHINA
Class rank: ***Top 5%***

Thesis — ***Image Colorization***

A new technique to convert grayscale images to color images is proposed. After segmentation of the grayscale image, each sub-region is given a uniform color by users. The algorithm finally provides a color image by minimizing the gradient difference and mean color difference.

Advisor — Prof. Chunhong PAN (CASIA)

PUBLICATIONS & PRESENTATIONS

[1] Wei, Y., Cotin, S.: Aneurysm: A (Near) Real-Time Simulation Method of Aneurysm Coil Embolization, in progress. InTech (2012)

[2] Wei, Y., Cotin, S., Allard, J., Fang, L., Pan, C., Ma, S.: Interactive blood-coil simulation in real-time during aneurysm embolization. Computers & Graphics **35**(2) (2011) 422 – 430

[3] Wei, Y., Fang, L., Cotin, S., Ma, S.: Interactive blood-coil simulation using discrete exterior calculus. International Conference on Vortex Flows and Vortex Models – ICVFM 2010 (2010)

[4] Wei, Y., Cotin, S., Fang, L., Allard, J., Pan, C., Ma, S.: Toward real-time simulation of blood-coil interaction during aneurysm embolization. Medical Image Computing and Computer-Assisted Intervention - MICCAI 2009 (2009)

Presented at the 2009 Conference on the Medical Image Computing and Computer-Assisted Intervention (**MICCAI 2009**), ***Young Scientist Award***, London.

Apr 9^{th} 2010 — Invited talk at GEOMETRICA Team, INRIA Sophia-Antipolis

May 21^{st} 2009 — Invited talk at Human-machine Interaction Lab, BUAA

Research Experience

2012.5–Present **Postdoc**, ***Geometrica***-*INRIA*

* Generated well-centered triangulation, particularly for the purpose of improving the mesh quality for fluid simulation using the Discrete Exterior Calculus Method;
* Participated in the development of ***CGAL*** project (an efficient C++ software library of geometric data structures and algorithms).

2006.9–2012.3 **Ph.D student**, *SHACRA-**INRIA** (FRANCE) & **LIAMA**-CASIA (CHINA)*

* Modeled the blood flow and blood-structure interaction for real-time simulation in aneurysm related research;
* First applied the DEC numerical approach in hemodynamic simulation, which was initially used in the field of computer graphics for the purpose of fast computation, and analyzed the accuracy, stability, and computational efficiency of the DEC method;
* Examined the impact of mesh quality on the DEC method, and improved the mesh quality, using interleaving refinement and optimization algorithm (implemented in C++) and Hodge optimization algorithm (implemented in Python);
* Participated in the development of ***SOFA*** project (a C++ open source framework primarily targeted at real-time medical simulation);
  - Independently developed the mesh generator to create and optimize Delaunay triangulation using CGAL library;
  - Independently developed the fluid simulator based on the DEC Method;
  - Contributed to the mesh geometry data structure for computing and storing the geometrical information (e.g., location, length) of the mesh elements (e.g., edge);
  - Designed the mesh topology data structure to support the orientation and adjacency information of mesh elements, for the purpose of describing oriented manifold mesh.
* Participated in the project of dental surgery simulation (in cooperation with Human-machine Interaction Lab, BUAA), and contributed to the volumetric modeling of the teeth using the octree algorithm.

Awards & Honors

2010–2011 *Foreign Young Scientist Scholarship*, INRIA, FRANCE

2008–2011 *Ph.D Fellowship of the French government*, FRANCE

2009 *Young Scientist Award - MICCAI 2009 Conference*, UK, *5/186*

2006 *Excellent Graduate Award*, Beijing, CHINA, *191/3798*

2004-2006 *Excellent Student Scholarship*, BUAA, CHINA, *5/100*

2005 *Study Star Award* (the highest student honor), BUAA, CHINA, *3/750*

2005 *3rd Prize in Fengru Cup Science & Technology Creative Contest*, BUAA, CHINA

Skills

Computer	Operating Systems: Windows, Linux, Mac OS X Programing: C++, Python, CGAL, OpenGL, OpenCV Software: Matlab, Paraview
Languages	Chinese (native), English (fluent), French (basic)

Interestes

Swimming	Won several medals in the Competitions of Chinese Academy of Sciences.