

## RESEARCH INTEREST

Simulation based Design, Interactive Design, Computer Simulation, Scientific Computing, User Interface, Finite Element Method, Iterative Linear Solver, Biomechanical Simulation

## EDUCATION

Ph.D candidate, Computer Science (October 2009 – present)  
The University of Tokyo, Japan  
Adviser: Takeo Igarashi

M.S., Frontier Science (April 2006 – September 2009)  
The University of Tokyo, Japan  
Thesis: Coupling analysis of skeletal muscles and skeletal system using lagrange multiplier  
Adviser: Toshiaki Hisada

B.S., Mechanical Engineering (April 2002 – March 2006)  
The University of Tokyo, Japan  
Thesis: Analysis of open and close phase of heart valve by changing connectivity in time step  
Adviser: Toshiaki Hisada

## PUBLICATION (JOURNAL)

Nobuyuki Umetani, Takeo Igarashi, Niloy J. Mitra, "Guided Exploration of Physically Valid Shapes for Furniture Design", SIGGRAPH 2012 (conditional accept)

Takashi Ijiri, Takashi Ashihara, Nobuyuki Umetani, Takeo Igarashi, Ryo Haraguchi, Hideo Yokota, and Kazuo Nakazawa, "A Kinematic Approach for Efficient and Robust Simulation of the Cardiac Beating Motion", PLoS One (accepted).

Bo Zhu, Michiaki Iwata, Ryo Haraguchi, Takashi Ashihara, Nobuyuki Umetani, Takeo Igarashi, Kazuo Nakazawa. Sketch-based Dynamic Illustration of Fluid Systems. SIGGRAPH ASIA 2011

Nobuyuki Umetani, Danny Kaufman, Takeo Igarashi, Eitan Grinspun, "Sensitive Couture for Interactive Garment Editing and Modeling", ACM Transaction on Graphics (SIGGRAPH 2011), 30(4), August, 2011

Nobuyuki Umetani, Kenshi Takayama, Jun Mitani, Takeo Igarashi, "Responsive FEM for Aiding Interactive Geometric Modeling", Computer Graphics & Applications

Nobuyuki Umetani, Scott Maclachlan, Kees Oosterlee, "A Multigrid-Based Shifted-Laplacian Preconditioner for a Fourth-Order Helmholtz Discretization", Numerical Linear Algebra with Applications, Volume 16, Issue 8, pp603-626,(2008)

Susumu Katayama, Nobuyuki Umetani, Seiryu Sugiura, and Toshiaki Hisada, "The sinus of Valsalva relieves abnormal stress on aortic valve leaflets by facilitating smooth closure", The Journal of Thoracic and Cardiovascular Surgery, vol.136, no.6, pp.1528-1535,(2008)

## PUBLICATION (CONFERENCE)

Nobuyuki Umetani, Kenshi Takayama, Jun Mitani, Takeo Igarashi : "Designing Custommade Metallophone with Concurrent Eigenanalysis", NIME++ June 15-17th 2010

Yohsuke Furuta, Nobuyuki Umetani, Jun Mitani, Takeo Igarashi and Yukio Fukui: "A Film Balloon Design System Integrated with Shell Element Simulation" (Short paper ), EUROGRAPHICS 2010, May 3rd-7th 2010

## **WORK EXPERIENCE**

Internship Researcher (February 2012-present)  
Microsoft Research Asia, China  
Supervisor : Dr. Weiwei Xu

Research Fellow (April 2010-present)  
Japan Society for the Promotion of Science

Research Assistant (2008 - 2010)  
JST ERATO Igarashi Design Interface Project, Japan  
Supervisor : Takeo Igarashi

Chief Developer (2008)  
Information – technology Promotion Agency (IPA) Exploratory Software Project, Japan  
Supervisor : Prof. Ikuo Takeuchi

## **AWARDS**

Microsoft Research Asia Fellowship (2011)

Best Paper Award (2010)  
WISS 2010(Japanese UIST), 18th Workshop on Interactive Systems and Software

Yamanouchi Award (2009)  
IPSI(Japanese ACM), Japanese Symposium on Programming

SUPER CREATOR (2008)  
Information-technology Promotion Agency (IPA) Exploratory Software

## **RESEARCH VISITS**

Computer Science Department, University College London, UK (August2011-November-2011)  
Mentor : Niloy J. Mitra

Columbia Computer Graphics Group, Computer Science Department, Columbia University, USA (April 2010-March 2011)  
Mentor : Eitan Grinspun

Numerical Analysis Group, Delft Institute of Applied Mathematics, Delft University of Technology, The Netherlands (April 2007-March 2008)  
Mentor : Kees Oosterlee

## **INVITED TALK**

Integration of Design, Simulation and Interaction, Max Planck Institute Infomatik, October 2011,  
Host : Michael Wand

Interactive integration of design and real-time simulation, New York University, September 2010  
Host : Kenshi Takayama

## **OPEN-SOURCE SOFTWARE**

DelFEM <http://code.google.com/p/delfem/>

This is an environment for solving various partial differential equations (PDE) using finite element method (FEM). Users can run FEA simulation through simple object oriented C++ problem description. This library is very fast compare to other software using specially designed linear system solver. Thus it achieves real-time computation and interaction between shape modeling and numerical simulation. I developed this library from scratch.

## **Technical Skills**

**C++**, **C**, **OpenGL**, **Qt**, **C#**, Fortran, .net, HTML, Subversion(SVN), PHP.

- Cross-platform C++ development, across Mac, Windows and Linux platforms.
- Developing large scale software (over 100 thousands lines)
- Distribute and maintain open-source software.