

# Marco Fratarcangeli

Email: [marcof@chalmers.se](mailto:marcof@chalmers.se)

Website: <http://www.cse.chalmers.se/~marcof/>

## Research interests

Interactive graphics, computational animation, high-performance numerical optimization.

## Academic Experience

2016–today	<b>Associate Professor at Chalmers University of Technology, Sweden.</b>
2014–2016	<b>Senior Lecturer at Chalmers University of Technology, Sweden.</b>
2011–2014	<b>Assistant Professor at Sapienza University of Rome, Italy.</b>
07 2017	<b>Visiting Professor at Disney Research Zurich, Switzerland.</b>
03-07 2014	<b>Visiting Professor at Tèlècom ParisTech, France.</b>

## Education

2004–2009	<b>Ph.D. in Computer Engineering, Sapienza University of Rome, Italy.</b> Thesis: <i>Computational Models for Animating Virtual Faces</i> . Supervisors: Marco Schaerf and Robert Forchheimer.
2004–2006	Visiting Ph.D. Student at Linköping Institute of Technology, Sweden. Research in face animation for model-based coding.
2004	M.Sc. (Laurea) in Computer Engineering. Sapienza University of Rome, Italy.

## Industrial Experience

2017–today	<b>CEO/CTO, Deform Dynamics AB, Sweden</b> Start-up company developing computational animation tools for virtual cloths.
2006–today	<b>Board member, Visage Technologies AB, Sweden.</b> Visage Technologies AB (2002) focuses on face tracking, eye tracking and face analysis. Ranked # 8 among the Sweden Technology Fast 50 companies for 2017. <a href="http://www.visagetechologies.com/">http://www.visagetechologies.com/</a> .
2009–2011	<b>Senior Software Engineer at Taitus Software srl, Italy.</b> Visualization tools for analysis and planning of Earth Observation missions for the European Space Agency.

## Fellowships and Grants

2016–2018	<b>Interactive 3D deformable bodies.</b> Vetenskapsrådet (Swedish Research Council), Starting grant, sole applicant, 2 453 000 SEK (~245 000 EUR)
2016–2018	<b>Interactive cloth animation research.</b> IKEA Communications AB, Industrial research project, sole applicant, 800 000 SEK (~80 000 EUR)
2017	<b>Parallel Algorithms for Interactive Simulations of 3D Soft Tissues.</b> Stiftelsen för internationalisering (STINT), PI, 150 000 SEK (15 000 EUR)
2016–2017	<b>ImageLife2 &amp; ImageLife.</b> Chalmers Area of Advance ICT, Seed projects, 300 000 SEK (~30 000 EUR)
2014	<b>Anatomically-inspired Face Animation for Behavioral Realization.</b> Telecom ParisTech, sole applicant, 8 000 EUR
2012–2015	<b>Surgical Threads Simulations Based on a Novel Information-Theory Approach,</b> Qatar National Research Foundation, ~990.000 EUR (~70.000 EUR)
2004	Three years fellowship awarded from the Italian Ministry of Research (MIUR) to support my PhD studies.

## Supervision of Ph.D. students

As a supervisor:

2018–2022	<b>Mads Jeppe Lyngholm Rønnow.</b> Chalmers, Sweden.
2012–2015	<b>Nadine Abu Rumman.</b> Sapienza, Italy

As a co-supervisor:

2018–2023	<b>Yuchong Zhang,</b> Chalmers, Sweden
2016–2020	<b>Tomasz Kosiński,</b> Chalmers, Sweden

## PhD Thesis Committee

2018	<b>Ehsan Miandji.</b> Evaluation Committee, Linköping University, Sweden.
2018	<b>Malek al-Sadeq.</b> Opponent (75% report), Chalmers, Sweden.
2016	<b>Jasper Molin.</b> Chairman, Chalmers, Sweden.
2016	<b>Viktor Kämpe.</b> Evaluation Committee, Chalmers, Sweden.
2014	<b>Jon Denning.</b> Evaluation Committee, Dartmouth College, USA

## Awards

2018	<b>Best Paper Award</b> at Pacific Graphics (PG).
2014	<b>Best Paper Award</b> at ACM Spring conference on Computer Graphics (SCCG).
2006	<b>Best Paper Award</b> at RoboCup International Symposium.
2004	<b>Honorable mention for the best ICT Master Thesis in Italy.</b> <i>Federcom-Aica</i> yearly recognize the best Italian master thesis in Information and Communication Technologies.

## Teaching

2018	Co-lecturer, <i>Parallel Iterative Solvers for Real-time Elastic Deformations</i> , SIGGRAPH ASIA course, Tokio, Japan.
2018	Co-lecturer (MSc), <i>Technology-Driven Experimental Game Design</i> , Chalmers, Gothenburg, Sweden.
2018	Lecturer (MSc), <i>Game Engine Architecture</i> , Chalmers, Gothenburg, Sweden.
2017	Lecturer (MSc), <i>Game Engine Architecture</i> , Chalmers, Gothenburg, Sweden.
2016	Lecturer (MSc), <i>Game Engine Architecture</i> , Chalmers, Gothenburg, Sweden.
2015	Lecturer (MSc), <i>Game Engine Architecture</i> , Chalmers, Gothenburg, Sweden.
2013	Lecturer (MSc), <i>Computer Graphics</i> , Sapienza, Rome, Italy.
2011	Lecturer (PhD), <i>Interactive Objects in Gaming Application</i> , Sapienza, Rome, Italy.
2012	Lecturer (MSc), <i>Computer Graphics</i> , Sapienza, Rome, Italy.
2011	Lecturer (PhD), <i>General-purpose computing on graphics processing units (GPGPU)</i> , Sapienza, Rome, Italy.
2007	Teaching Assistant (MSc), <i>Computer Graphics</i> , Sapienza, Rome, Italy.
2004	Teaching Assistant (MSc), <i>Computer Graphics</i> , Sapienza, Rome, Italy.

## Commissions of Trust

2018	Scientific Evaluator, Östersjöstiftelsen
2018	Scientific Evaluator, Italian Ministry of Education, Universities and Research (MIUR) for the Young Researchers Program "Rita Levi Montalcini".
2016	Scientific Evaluator, Italian Ministry of Education, Universities and Research (MIUR) for Projects of national interest (PRIN).
2016	Scientific Evaluator, Icelandic Research Fund (IRF), Grant of excellence.
2014	Scientific Evaluator, Ministry of Business, Innovation & Employment of New Zealand

## Organization of Scientific Meetings

2018	PC Member, Eurographics
2018	PC Member, ACM SCA, Symposium on Computer Animation
2017	Conference chair, ACM Virtual Reality Software and Technology (VRST)
2018, 2017	PC Member, Eurographics Smart Tools and Apps in Computer Graphics
2016, 2015	
2018, 2016	PC Member, ACM NordiCHI, Nordic Conference on Human-Computer Interaction
2017	PC Member, ACII, Affective Computing and Intelligent Interaction
2017, 2016	PC Member, DiGRA/FDG Digital Games Research, Foundations of Digital Games
2014	PC Member, SIGRAD, Eurographics Swedish Chapter

## Service as Reviewer

Eurographics (2018, 2017, 2013, 2012, 2011, 2010), Symposium of Computer Animation (2018), SIGGRAPH (2017), Pacific Graphics (2017), Graphical Models (2017, 2016, 2015), Computer Animation and Virtual Worlds (2017, 2015, 2013), SIGGRAPH Asia (2016, 2010), ACM Transaction on Graphics (2016), Computer Graphics Forum (2016), Computer & Graphics (2018, 2016), Journal of Graphical tools (2015,

2014), IEEE Transactions on Circuits and Systems for Video Technology (2015), International Journal of High Performance Computing (2015), ACM Transactions on Affective Computing (2014), Computer Animation and Social Agents (2014), CGI (2012), ACM Transactions on Haptics (2011), Virtual Reality Interaction and Physical Simulation (2010), Eurographics short papers (2006)

## Invited Talks

- |         |   |
|---------|---|
| 04/2018 | <i>Accurate Elastic Bodies in Real-Time</i><br>University of New Mexico, Albuquerque, USA. Invited by Yin Yang.   |
| 10/2017 | <i>Fast, Interactive Deformable Bodies</i><br>ICCV Workshop on Image-based Modeling of Articulated and Deformable Objects, Venice, Italy. Invited by Fiora Pirri.     |
| 06/2017 | <i>Sustainability in the digital world</i><br>International Society for Information Studies Summit (IS4SI), Gothenburg, Sweden.<br>Invited by Gordana Dodig-Crnkovic. |
| 02/2017 | <i>Interactive Solving of Large and Sparse Linear Systems.</i><br>Bellairs Workshop on Computer Animation, Barbados. Invited by Paul Kry.                             |

I have been featured on *Two minutes papers*, a popular Youtube video channel disseminating "awesome research for everyone" with more than 160K followers. [link](#)

## International Conference Talks

- |      |  |
|------|--|
| 2016 | SIGGRAPH Asia, Macau, China.   |
| 2015 | Eurographics, Zurich, Switzerland.                                     |
| 2014 | SIGRAD, Eurographics Swedish Chapter, Gothenburg, Sweden.              |
| 2012 | ACM Symposium on Facial Analysis and Animation. Vienna, Austria.       |
| 2012 | Computer Animation and Social Agents (CASA), Singapore.                |
| 2005 | Eurographics, Short papers session. Dublin, Ireland.                   |
| 2005 | IEEE Image and Signal Processing and Analysis (ISPA). Zagreb, Croatia. |
| 2005 | Virtual Reality and Physical Simulations(VriPhys). Pisa, Italy.        |
| 2004 | Computer Animation and Social Agents (CASA), Geneva, Switzerland.      |

## Publications

H-index: **11** (2018), **8** (2017) – Google scholar: [link](#)

In the last three years, I have published 1 paper in ACM Trans. on Graphics (presented at SIGGRAPH ASIA), and 4 papers in Computer Graphics Forum (2 presented at EUROGRAPHICS). These are acknowledged as the first and the second best scientific journals, respectively, in the Computer Graphics area.

## Journal Articles

11. HUANG J., WANG Q., FRATARCANGELI M., YAN K., PELACHAUD C.: Multi-variate gaussian-based inverse kinematics. *Computer Graphics Forum* 36, 8 (Feb. 2017), 418–428
10. WANG Z., FRATARCANGELI M., RUIMI A., SRINIVASA A.: Real time simulation of inextensible surgical thread with force output for haptic feedback applications. *International Journal of Solids and Structures* 113–114 (May 2017), 192–208
9. FRATARCANGELI M., TIBALDO V., PELLACINI F.: Vivace: A practical gauss-seidel method for stable soft body dynamics. *ACM Trans. Graph. (Siggraph ASIA)* 35, 6 (Nov. 2016), 214:1–214:9
8. HUANG J., MARCO F., DING Y., PELACHAUD C.: Inverse kinematics using dynamic joint parameters. *The Visual Computer* 33, 12 (December 2017), 1541–1553
7. FRATARCANGELI M., PELLACINI F.: Scalable partitioning for parallel position based dynamics. *Computer Graphics Forum (Eurographics)* 34, 2 (2015), 405–413
6. MARCUŠ N., FRATARCANGELI M., PANDZIC I., AHLBERG J.: Fast rendering of image mosaics and ascii art. *Computer Graphics Forum* 34, 6 (September 2015), 251–261
5. RUMMAN N. A., FRATARCANGELI M.: Position-based skinning for soft articulated characters. *Computer Graphics Forum* 34, 6 (2015), 240–250
4. FRATARCANGELI M., PELLACINI F.: A GPU-based implementation of position based dynamics for interactive deformable bodies. *Journal of Graphics Tools* 17, 03 (2015), 59–66. Invited Paper
3. FRATARCANGELI M.: Position-based facial animation synthesis. *Computer Animation and Virtual Worlds* 23, 3-4 (2012), 457–466
2. ZARATTI M., FRATARCANGELI M., IOCCHI L.: A 3d simulator of multiple legged robots based on usarsim. *RoboCup 2006: Robot Soccer World Cup X 4434* (2007), 13–24
1. FRATARCANGELI M., SCHAERF M., FORCHHEIMER R.: Facial motion cloning with radial basis functions in mpeg-4 fba. *Graphical Models* 69, 2 (2007), 106–118

## Book Chapters

3. RUMMAN N. A., FRATARCANGELI M.: *Skin Deformation Methods for Interactive Character Animation*. Springer International Publishing, Cham, 2017, pp. 153–174
2. FRATARCANGELI M.: Gpgpu cloth simulation using glsl, opencl and cuda. In *Game Engine Gems 2*, Lengyel E., (Ed.), 1 ed. A K Peters/CRC Press, February 2011, ch. 22, pp. 365–379
1. FRATARCANGELI M.: A versatile and interactive anatomical human face model. In *Game Programming Gems 8*, Lake A., (Ed.), 1 ed. Cengage Learning PTR, March 2010, ch. 2.1, pp. 121–132

## International Refereed Conferences

18. PALL P., NYLEN O., FRATARCANGELI M.: Fast Quadrangular Mass-Spring Systems using Red-Black Ordering. In *Workshop on Virtual Reality Interaction and Physical Simulation* (2018), Andrews S., Erleben K., Jaillet F., Zachmann G., (Eds.), The Eurographics Association
17. CALABRESE C., FRATARCANGELI M., PELLACINI F.: sLayer: a System for Multi-Layered Material Sculpting. In *Eurographics Symposium on Rendering - Experimental Ideas & Implementations* (2017), Zwicker M., Sander P., (Eds.), The Eurographics Association
16. NELSON V., MCEVOY P. M., FRATARCANGELI M.: Practical offline rendering of woven cloth. In *Proceedings of the Conference on Smart Tools and Applications in Computer Graphics* (Goslar Germany, Germany, 2016), STAG '16, Eurographics Association, pp. 63–70
15. RUMMAN N. A., FRATARCANGELI M.: State of the art in skinning techniques for articulated deformable characters. In *Proceedings of the 11th Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications: Volume 1: GRAPP* (Portugal, 2016), GRAPP 2016, SCITEPRESS - Science and Technology Publications, Lda, pp. 200–212
14. DANCU A., FRATARCANGELI M., FOURGEAUD M., FRANJCIC Z., CHINDEA D., FJELD M.: Low-cost Experimental Setups for Mid-air 3D Reconstruction. In *Smart Tools and Apps for Graphics - Eurographics Italian Chapter Conference* (2015), Giachetti A., Biasotti S., Tarini M., (Eds.), The Eurographics Association
13. RUMMAN N. A., FRATARCANGELI M.: Position based skinning of skeleton-driven deformable characters. In *ACM Spring Conference on Computer Graphics* (2014), SCCG '14, ACM, pp. 83–90. Best paper award
12. FRATARCANGELI M., PELLACINI F.: Towards a massively parallel solver for position based dynamics. In *SIGRAD, Swedish Chapter of Eurographics* (Göteborg, Sweden, June 2014), Computing V., (Ed.)
11. TIRITICCO D., FRATARCANGELI M., FERRARA R., MARRA S.: Near real-time multi-gpu  $\omega k$  algorithm for sar processing. In *Big Data from Space (BiDS)* (October 2014), Agency-ESRIN E. S., (Ed.), pp. 277–280
10. MURRU G., FRATARCANGELI M., EMLER T.: Practical augmented visualization on handheld devices for cultural heritage. In *Computer Graphics, Visualization and Computer Vision* (2013), Agency V. S.-U., (Ed.)
9. FRATARCANGELI M.: Interactive, musculoskeletal model for animating virtual faces. In *ACM Symposium on Facial Analysis and Animation* (September 2012), FAA '12, ACM, pp. 16:1–16:1
8. FRATARCANGELI M., ANDOLFI M., STANKOVIC K., PANDZIC I.: Animatable face models from uncalibrated input pictures. In *IEEE Conference on Telecommunications. ConTEL* (June 2009), pp. 177–184
7. FANELLI G., FRATARCANGELI M.: A non-invasive approach for driving virtual talking heads from real facial movements. In *IEEE 3DTV Conference* (May 2007), pp. 1–4
6. KUBIAK B., PIETRONI N., GANOVELLI F., FRATARCANGELI M.: A robust method for real-time thread simulation. In *ACM Symposium on Virtual Reality Software and Technology* (2007), VRST '07, ACM, pp. 85–88
5. ZARATTI M., FRATARCANGELI M., IOCCHI L.: A 3d simulator of multiple legged robots based on usarsim. In *Springer Robocup 2006 Symposium* (2006), Springer. Best paper award

4. FRATARCANGELI M.: Physically based synthesis of animatable face models. In *Virtual Reality and Physical Simulation (Eurographics VRIPHYS)* (Pisa, Italy, November 2005), ISTI-CNR, Eurographics Association, pp. 32–39
3. FRATARCANGELI M., SCHAERF M.: Facial motion cloning using global shape deformation. In *Eurographics Short Papers* (Dublin, Ireland, August 2005), The Eurographics Association and The Image Synthesis Group, pp. 89–92
2. FRATARCANGELI M., SCHAERF M.: Fast facial motion cloning in mpeg-4. In *IEEE Image and Signal Processing and Analysis (ISPA)* (Zagreb, Croatia, September 2005), IEEE - Signal Processing Society, pp. 310–315
1. FRATARCANGELI M., SCHAERF M.: Realistic modeling of animatable faces in mpeg-4. In *Computer Animation and Social Agents* (Geneva, Switzerland, July 2004), MIRALAB, Computer Graphics Society (CGS), pp. 285–297