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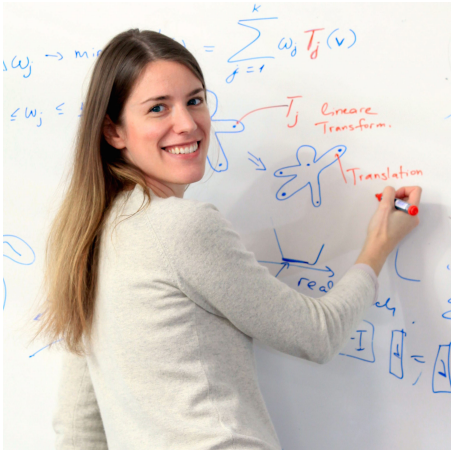
Eurographics Outstanding Technical Contributions Award 2017: Olga Sorkine-Hornung



Olga Sorkine-Hornung is an Associate Professor of Computer Science at ETH Zurich, and is the current head of the Institute of Visual Computing. She received her degrees from Tel Aviv University, including her PhD in 2006. She spent two years as a post-doc at TU Berlin and three years at the Courant Institute of the New York University before establishing at her current position at ETH Zurich in 2011.

Olga has an outstanding record of contributions in geometry processing. Starting with her paper on Laplacian surface editing, her work has led to shape representations and algorithms that make it easier to author graphics content interactively. She has made contributions to many areas of graphics where problems have some aspects that can be characterized geometrically, such as the introduction of differential and linear rotation-invariant coordinates for meshes, the as-rigid-as-possible mesh editing, the use of bounded biharmonic weights for real-time deformation, image editing and content aware retargeting. She has published a high amount of papers in the top journals, including a steady stream of papers at Eurographics and SIGGRAPH. Her work spans a great range from fundamental theoretical issues in geometry processing, including reconstruction, filtering, parameterization, meshing and compression of geometric data, to very practical methods for computer graphic content creation, including artistic modelling techniques, digital fabrication, computer animation and digital image manipulation. Her technical contributions usually have a special insight that opens new solutions to complex problems with clever and key ideas that may seem apparently simple but produce elegant, robust and efficient algorithms. The remarkable impact of her research, with an increase of more than 150 citations per month at the beginning of 2017, is beyond any doubt.

The contributions of Olga Sorkine-Hornung are not only advancing the theory but have also produced two US patents on Sketch-based generation and editing of quad meshes and Transfusive image manipulation.

Olga Sorkine-Hornung has chaired many program committees, including EG 2015, SGP 2010 and Pacific Graphics 2017, and has a remarkably extensive participation on conference committees. She has been leading many research projects, including the 2012-2017 ERC Starting Grant on “Intelligent Shape Modeling”. She is a popular and reputed conference keynote speaker, including the invited keynote lecture “Interactive shape modeling: progress and challenges” at Eurographics 2013.

Olga Sorkine-Hornung received the 2008 EUROGRAPHICS Young Researcher Award and the 2011 ACM SIGGRAPH Significant New Researcher Award. She is a Fellow of Eurographics since 2015. She received the best paper award at SGP 2014 and 3DV 2016, together with the SGP Software Award 2015 for the geometric processing library libigl, with other co-contributors. She won the Intel Early Career Faculty Award in 2013. Since winning these awards she has been even more active and has mentored many productive students (a total of 18 PhD students and postdocs between 2009 and 2016) who have now become very active researchers worldwide. She is presently supervising 5 students.

Eurographics is extremely pleased to recognize Olga Sorkine-Hornung with the 2017 Outstanding Technical Contributions Award.

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Eurographics Young Researcher Award 2017: Alec Jacobson

Alec Jacobson finished his PhD at ETHZ in 2013, under the supervision of Olga Sorkine-Hornung. His thesis proposed novel algorithms and interfaces for the real-time deformation of raster images, line graphics, geometric models, and animated characters. He received the ETHZ Medal (awarded to the top 8% of PhD graduates per discipline at ETH) and the Eurographics PhD award. He is presently an Assistant Professor in the Dynamic Graphics Project at the Department of Computer Science of the University of Toronto. He has been working at various well-known international research institutions, including Columbia University and ETH Zürich. He had an Intel PhD Fellowship in 2013.

His research interests cover many aspects of geometry processing using ideas from differential geometry and finite-element analysis. He is also exploring novel user interfaces to reduce user effort, like modular input devices for character articulation.

Alec Jacobson has an impressive record of top publications in the last years, with five ACM TOG papers (Siggraph or Siggraph Asia) in 2014 and 2015 and three Siggraph papers in 2016 and with a number of citations which is rapidly increasing. His paper on Bounded Biharmonic Weights for Real-Time Deformations was also published as a Research Highlight in the Communications of the ACM. His 2012 work on Fast Automatic Skinning Transformations, published also at ACM TOG, provides an efficient tool for computing skinning transformations and controlling articulate shapes and characters. The proposed solution is based on computing the unconstrained degrees of freedom by optimizing nonlinear, rigidity energies, and is able to control disconnected skeletons with shape-aware inverse kinematics. He proposed an approach based on stretchable and twistable bones for skeletal shape deformation, and derived a really elegant and robust inside-outside segmentation algorithm that uses generalized winding numbers.

Most of his top-ranked publications have him as first author. He has given more than 25 invited talks since 2010.

Alec was nominated as a US Junior Oberwolfach Fellow in 2015, and he also obtained the 2015 Eurographics/ACM Symposium on Geometry Processing Software Award for his work and leadership in the "libigl" project, a popular Open Source platform for Geometry Processing algorithms. The libigl library not only covers his work, but also provides re-implementations of algorithms published by other researchers. He is also involved in the gptoolbox project to produce a Geometry Processing ToolBox for MATLAB.

Alec Jacobson is a well-known young researcher with a specialization in Geometry Processing and realtime deformation of 3D models. He has made a number of top relevant contributions with significant impact and has a strongly upward pointing gradient. He is very active in advising PhD students and in international cooperation research initiatives. He was the 2014 Heidelberg Laureate Forum Young Researcher. He received the 2014 Eurographics Annual Award for the Best PhD Thesis.

Eurographics is pleased to recognize Alec Jacobson with the 2017 Young Researcher Award.

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Eurographics Young Researcher Award 2017: Belen Masia

Belen Masia received her MS (2010) and PhD (2013) from the Universidad de Zaragoza where she is now an Assistant Professor. She was the recipient of a 2012 NVIDIA Graduate Fellowship. In 2012 and 2013, she spent a total of seven months as a visiting student at the Camera Culture Group of the MIT Media Lab, under the supervision of Prof. Ramesh Raskar. In 2015, she was a postdoctoral researcher at MPI Informatik, and a member of the Max Planck Center for Visual Computing and Communication.

Belen Masia's research combines the areas of computational displays, computational photography, and perception. Highlights of her work include work on imaging at picosecond resolution, and applying perceptual principles to computational imaging. Her work has produced an impressive number of indexed journal publications and conference talks, including multiple papers in SIGGRAPH / TOG and Eurographics, and several best paper awards. Her very first paper, Evaluation of reverse tone mapping through varying exposure conditions (ACM TOG) presented perceptual studies for reverse tone mapping with a particular focus on under- and over-exposed low dynamic range images. The paper included interesting and strong results that are useful in practice and point to a number of important future research directions, while also defining and executing user studies in a precise way, which is critical for evaluating perceptual questions surrounding imaging applications. Her work on Display Adaptive 3D Content Remapping presents an optimization approach to adapt light fields by depth scaling to reduce blur when rendered for auto-multiscopic displays. The approach of the paper is solid and the results are convincing. Perceptual questions again play an important role and the paper makes clever choices to make the optimization tractable.

Belen Masia most cited work is her paper on femto-photography, presented at Siggraph 2013. This paper made the ACM Best of 2013 list, and has been featured as a Research Highlight in the September 2016 issue of the Communications of the ACM Journal, under the title "Imaging the Propagation of Light Through Scenes at Picosecond Resolution". This work has contributed to better understand how light propagates, helping to sample (as opposed to integrate over) the time dimension. Applications of transient imaging span a wide range of fields, including medicine, surveillance, material science or, as she demonstrated in a follow-up paper, novel visualizations of relativistic effects.

Belen Masia's research work also includes the analysis of coded apertures for defocus deblurring, visual comfort when viewing stereo content, interaction paradigms for light field editing, or a novel intuitive control space for material editing. For this, she has built functionals that are able to map the perceptual attributes of materials to an underlying, low-dimensional representation of BRDFs.

Belen Masia received the Eurographics PhD dissertation Award in 2015. She has continued to make significant contributions since then, and has moved beyond work done in collaboration with her advisor, and is now publishing with her own students.

Eurographics is pleased to recognize Belen Masia with the 2017 Young Researcher Award.

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Thoughts on Computational Photography

Fredo Durand

Autodesk

Abstract

Computational photography is based on the idea that computation has a central role in image formation. The final image we get is not a simple projections of light onto a sensor but undergoes deep calculations. This allows us to gather visual information that would be hard or impossible through optics alone. In this talk, I reflect on the successes and challenges of computational photography, and lay out research opportunity lying ahead.

Biography

Frédo Durand is a professor of Electrical Engineering and Computer Science at the Massachusetts Institute of Technology, and a member of the Computer Science and Artificial Intelligence Laboratory (CSAIL). He received his PhD from Grenoble University, France, in 1999, supervised by Claude Puech and George Drettakis. From 1999 till 2002, he was a post-doc in the MIT Computer Graphics Group with Julie Dorsey.

He works both on synthetic image generation and computational photography, where new algorithms afford powerful image enhancement and the design of imaging system that can record richer information about a scene. His research interests span most aspects of picture generation and creation, with emphasis on mathematical analysis, signal processing, and inspiration from perceptual sciences. He co-organized the first Symposium on Computational Photography and Video in 2005, the first International Conference on Computational Photography in 2009, and was on the advisory board of the Image and Meaning 2 conference. He received an inaugural Eurographics Young Researcher Award in 2004, an NSF CAREER award in 2005, an inaugural Microsoft Research New Faculty Fellowship in 2005, a Sloan fellowship in 2006, a Spira award for distinguished teaching in 2007, and the ACM SIGGRAPH Computer Graphics Achievement Award in 2016. He is on the scientific advisory board of light.co, Technicolor, Shaper Tools, and Moju Labs.

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The Joy of Computer Graphics Programming

Bruno Levy

Inria Nancy Grand-Est

Abstract

It's a lot of fun to do research in a vibrant domain such as computer graphics. In my personal experience, a great part of the fun comes from -programming-, an activity that lies at the interface between the mathematics and the hardware, and that interplays with both in subtle and fascinating patterns. I'll try to illustrate the fun of programming with tips and tricks on different aspects of computer graphics programming, examplified with routines of the GEOGRAM open-source library. I will also demonstrate their use in some of my on-going research projects on spectral geometry, volumetric parameterization and optimal transport.

Biography

Bruno Levy is a senior researcher with Inria, and the head of the ALICE group (geometry processing and computer fabrication) that he created in 2004 (now 8 faculties). He received the Inria/French Academy of Sciences young researcher award in 2011. He is associate editor for ACM TOG and Graphical Models, and he is a member of the steering committee of SMA/SPM. He was paper co-chair of Eurographics 2014, Pacific Graphic 2013, SGP 2010, SPM 2008 and 2007. His main research topic is geometry processing. In the past, he focused on mesh parameterization, texture mapping and conversion between representations (e.g. mesh to Splines). More recently, in the frame of his ERC projects GOODSHAPE and VORPALINE, he worked on sampling (vector quantization) and meshing (isotropic, anisotropic, hex-dominant mesh generation). His latest research concerns efficient numerical algorithms for solving partial differential equations (such as Monge-Ampere involved in optimal transport) and practical geometric algorithms (robust predicates, anisotropic Voronoi diagrams in high dimensions and hexahedral meshing).

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What is Time?

Jos Stam, Autodesk

Abstract

Menu Prix Fixe (vegetarian)

- **Entree:** Ten year old aged Nucleus.
- **Main course:** Observations about time à la sauce computer graphics.
- **Dessert:** Optimization with a sprinkle of dual numbers.
- **Suggested wine:** "The Art of Fluid Animation." Cuvee 2015. Toronto, Canada.

This is how our Chef, coming to your comfy seat, will explain the three courses.

Firstly, Nucleus is a unified dynamics solver that I first prepared and presented at a keynote talk Eurographics in Vienna in 2006. Today we will show how this solver, implemented in Autodesk MAYA, has been used in the industry. I will also show different extensions that have been implemented since then. Animations will be shown. But please keep your appetite for the other courses.

Then you will be served la piece de resistance. Ah Time. Qu'est ce que c'est? A simple question with a long history and sometimes surprising consequences. As in, there is no definite answer but exploring this question leads to interesting research. Time is important in computer graphics. Obviously in simulation but even there, there are surprises. I will illustrate some of these concepts using visuals and some live demos. This will be short a la Nouvelle Cuisine.

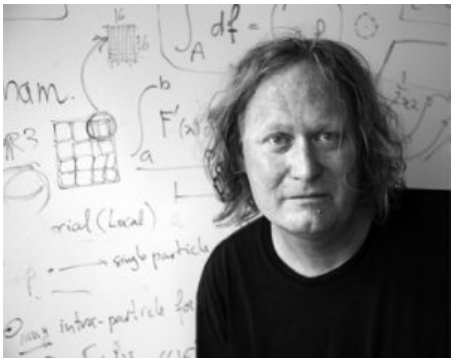
Finally, for dessert I will talk about some techniques to optimize problems at the code level. You can implement complex math differentials with simple code. In this talk I will also serve you some optimization frameworks I have been exploring recently which can potentially solve for dynamics and create geometrical shapes. I will also mention Georges Perec, the guy who wrote a readable novel wihout the letter "e."

About the wine. The beauty is that you can sample it before hand: https://www.autodeskresearch.com/publications/art-fluid-animation

Bon appétit messieurs dames.

This meal will be served in the culinary capital of France: Lyon on April 28, 2017.

Biography



Jos Stam was born in the Netherlands and educated in Geneva, Switzerland, where he received dual Bachelor degrees in computer science and pure mathematics. In 1989, Stam moved to Toronto, Canada, where he completed his Masters and Ph.D. degrees in computer science. After that he pusrsued postdoctoral studies as a ERCIM fellow at INRIA in France and at VTT in Finland. In 1997 Stam joined the Alias Seattle office as a researcher and stayed there until 2003 to relocate to Alias' main office in Toronto. Stam is now employed with Autodesk as a Principal Scientist as part of Autodesk's acquisition of Alias in 2006.

Stam's research spans several areas of computer graphics: natural phenomena, physics-based simulation, rendering and surface modeling, especially subdivision surfaces. He has published papers in all of these areas in journals and at conferences, most notably at the annual SIGGRAPH conference. In 2005 Stam was awarded one of the most prestigeous awards in computer graphics: the SIGGRAPH Computer Graphics Achievement Award. And for the impact his work on subdivision surfaces and fluid simulation has had on the movie industry, he was awarded two Technical Achievement Awards from the Academy of Motion Picture Arts and Sciences. Also known as "SciTech Oscars" in 2006 and 2008.

Stam also created a solver called Nucleus which he first presented at a keynote talk at Eurographics in Vienna in 2006. Nucleus is a unified simulation framework for computer graphics implemented in our MAYA software.

Stam has also given many keynote/invited presentations in many continents except for Antartica and Africa.

Stam recently published a book called "The Art of Fluid Animation:" A down to earth and whacky overview of his work on fluid dynamics from an animation and computer graphics perspective.