The European Association for Computer Graphics
40th Annual Conference

EUROGRAPHICS 2019

Genoa, Italy
May 6th – 10th, 2019

Organized by

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THE EUROPEAN ASSOCIATION
FOR COMPUTER GRAPHICS

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Dey, Tamal Krishna
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DiVerdi, Stephen
Dong, Zhao
Duncan, Noah
Dvoroznak, Marek
Eilertsen, Gabriel
Ezuz, Daniel
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Fernandes, Leandro
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Gharbi, Michael
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Holzschuch, Nicolas
Hongyi, Xu
Hormann, Kai
Hornus, Samuel
Hu, Ruizhen
Hu, Xinghong
Idoughi, Ramzi
Iseringhausen, Julian
Jacobson, Alec
Jakob, Wenzel
Jamriska, Ondrej
Jarabo, Adrián
Jeschke, Stefan
Joo, Hanbyul
Ju, Tao
Kadlecek, Petr
Kalantari, Nima Khademi
Kalogerakis, Evangelos
Kanamori, Yoshihiro
Kapadia, Mubbasir
Kaplan, Craig
Kaplanyan, Anton S.
Karamouzas, Ioannis
Kaspar, Alexandre
Kaufman, Danny
Keinert, Benjamin
Kelly, Tom
Kettunen, Markus
Kim, Byungsoo
Kim, Taehwan
Kim, Theodore
Klein, Reinhard
Kobbelt, Leif
Komura, Taku
Koschier, Dan
Kozlikova, Barbora
Kronander, Joel
Krone, Michael
Kry, Paul

Laga, Hamid
Ledoux, Franck
Lee, Jehee
Lee, Sung-Hee
Legde, Katharina
Levi, Zohar
Levin, David
Li, Chenhui
Li, Tianye
Li, Xin
Li, Yin
Liang, Wei
Litany, Or
Liu, Ligang
Liu, Xiaopei
Liu, Xueting
Liu, Yebin
Livesu, Marco
Lopez-Moreno, Jorge
Low, Cheng-Yaw
Lu, Huimin
Lu, Jingwan
Luan, Fujun
Macklin, Miles
Malisiewicz, Tomasz
Mantiuk, Rafal
Maron, Haggai
Marroquim, Ricardo
McDonnell, Rachel
McGuire, Morgan
Meina, Kan
Melzi, Simone
Merigot, Quentin
Micallef, Luana
Miguel, Eder
Monszpart, Aron
Montano, Roberto
Mousas, Christos
Müller, Thomas
Mura, Claudio
Mustafa, Maryam
Muthuganapathy, R.
Myszkowski, Karol
Nakada, Masaki
Nan, Liangliang
Neverova, Natalia
Nivoliers, Vincent
Nowrouzezahrai, Derek
Olszewski, Kyle
Öztireli, Cengiz

Pacanowski, Romain
Palmer, David
Pan, Zherong
Panotopoulou, Athina
Panozzo, Daniele
Patney, Anjul
Patow, Gustavo
Peers, Pieter
Peng, Xue Bin
Peng, Chi-Han
Pérez Rodríguez, Jesús
Pettre, Julien
Pons-Moll, Gerard
Poranne, Roi
Pottmann, Helmut
Prada, Fabian
Pulli, Kari
Qi, Charles R.
Qian, Jianliang
Qin, Hongxing
Rhee, Taehyun
Rhodin, Helge
Ritchie, Daniel
Roberts, Mike
Rodgers, Peter
Rohmer, Damien
Sacht, Leonardo
Saito, Jun
Salcedo-Sanz, Sancho
Sander, Pedro

Sato, Syuhei
Sauvage, Basile
Savva, Manolis
Sawhney, Rohan
Schied, Christoph
Schreck, Tobias
Schulz, Adriana
Schwarz, Michael
Seo, Hyewon
Serrano, Ana
Sharp, Nicholas
Sheinin, Mark
Shu, Zhixin
Sifakis, Eftychios
Singh, Gurprit
Sintorn, Erik
Smith, Neil
Song, Ran
Staib, Matthew
Stauder, Jurgen
Stava, Ondrej
Stupariu, Mihai-Sorin
Sun, Hanqiu
Sunkavalli, Kalyan
Susin, Toni
Tal, Ayellet
Tang, Chengcheng
Tarini, Marco
Teschner, Matthias
Tewari, Ayush

Thomaszewski, Bernhard
Trettner, Philip
Troccoli, Alejandro
Tsai, Yi-Hsuan
Tursun, Okan Tarhan
Tycowicz, Christoph von
Umetani, Nobuyuki
Umlauf, Georg
Valette, Sebastien
Vanderhaeghe, David
Vantzos, Orestis
Vaxman, Amir
Walter, Bruce
Wan, Liang
Wand, Michael
Wang, Huamin
Wang, Oliver
Wang, Pengshuai
Wang, Rui
Wang, Ting-Chun
Wang, Yu
Wei, Li-Yi
Weinkauf, Tino
Weiss, Tomer
Werner, Sebastian
Won, Jungdam
Wood, Erroll
Wu, Hongzhi
Wu, Lifan
Xian, Chuhua

Xiao, Dunhui
Xie, Minshan
Xu, Chenliang
Xu, Hongyi
Xu, Kai
Xu, Ning
Xu, Zexiang
Yan, Lingqi
Yang, Jiaolong
Ye, Yuting
Yeung, Sai-Kit
Yi, Li
Yi, Zili
Yoon, Sungeui
Yu, Wenhao
Yu, Xiang
Yumer, Ersin
Zell, Eduard
Zhang, Eugene
Zhang, Richard
Zhang, Xuaner
Zhou, Yipin
Zhu, Yufeng
Zirr, Tobias
Zollhoefer, Michael
Zou, Changqing

Author Index

TABLE OF CONTENTS

Award Winners

Invited Talks

Procedural Modeling

Meshing and Geometry Processing

Fluids

Styles and Fonts

TABLE OF CONTENTS

TABLE OF CONTENTS

Eurographics Outstanding Technical Contributions Award 2019: Niloy Mitra

Niloy Mitra is a Professor in the Department of Computer Science at University College in London where he leads the Smart Geometry Processing Group. He received his Bachelor's degree from IIT Kharagpur, and his Master's and PhD degrees from Stanford University. Before establishing his position at UCL in 2011, he was a postdoctoral scholar at TU Vienna, and an assistant professor at IIT Delhi and KAUST.

Niloy has an extraordinary record of outstanding research contributions in the areas of shape analysis, data-driven geometry processing, and computational fabrication. In recognition of his research, he has received the ACM SIGGRAPH Significant New Researcher Award for "his outstanding work in discovery and use of structure and function in 3D objects" in 2013, and the BCS Roger Needham award in 2015 for "distinguished research contribution in computer science". His work has been funded by an ERC Starting Grant on SmartGeometry, ERC Proof-of-Concept Grant, a Google Faculty Fellowship, and was twice featured as research highlights in the Communications of the ACM.

Niloy's research spans a range of problems focused around representing, analyzing, processing, fabricating, and editing 3D shapes for computer graphics applications. He has contributed widely used algorithms on fundamental aspects such as normal estimation in noisy data, geometry completion, and local and global shape alignment. As an example, his technique for surface registration based on 4-point congruent sets has introduced a highly original approach to the problem of shape registration and been established as a standard approach in many practical scenarios. He further pi-

oneered research on symmetry and structural regularity detection in 3D objects, contributing several algorithms that have become building blocks for a variety of applications. This work inspired structure-aware geometry processing, an entire subfield in 3D geometry processing that is concerned with detecting and exploiting regular structures in 3D shapes to address various problems, including shape registration, completion, manipulation, and reconstruction. A further core theme in Niloy's work is the problem of representing entire shape collections in order to support operations such as interactive modeling, shape space exploration, and analysis including classification, segmentation, and functionality detection. He has broken new ground in this area by introducing a number of highly innovative problem statements and proposing creative and sophisticated data-driven solutions. His work showed how to leverage novel shape representations and algorithms in a number of applications, for example to explore shape collections that fulfill physical constraints, ensure that they can be fabricated, provide an intended functionality, or synthesize new editable geometric content. Niloy's work undoubtedly has made an extraordinary impact in the academic research community and in industry. He has been granted several patents, and his academic publications appear regularly in the top journals and conferences in the field, receiving thousands of citations every year.

In addition, Niloy has provided outstanding service to the research community. He has served as the SIGGRAPH Asia Course Chair in 2016, as the conference chair for Advances in Architectural Geometry (AAG), the SIGGRAPH Asia Workshop on Indoor Scene Understanding both in 2014, and Symposium of Geometry Processing in 2017. He has been program chair for several conferences such as Geometric Modeling and Processing 2019, Pacific Graphics 2015, Symposium on Geometry Processing 2012, and Shape Modeling International 2011. In addition, he has served as an associate editor for ACM Transactions on Graphics, Computer Graphics Forum, IEEE Transactions on Visualization and Computer Graphics, the Visual Computer, and Computers & Graphics, not to mention the dozens of conference program committees he has participated in. Finally, he is in high demand as a speaker for conference keynotes and invited talks, including keynotes at the Eurographics, the Symposium on Geometry Processing, Vision, Modeling, and Visualization conference, ACM CAD/Graphics, and Pacific Graphics.

Eurographics is extremely pleased to recognize Niloy Mitra with the 2019 Outstanding Technical Contributions Award.

Eurographics Young Researcher Award 2019:
Benjamin Bach

Benjamin Bach obtained his PhD in 2014 from the Université Paris Sud where he worked in the Aviz Group at INRIA. The PhD thesis entitled "Connections, Changes, and Cubes: Unfolding Dynamic Networks for Visual Exploration" got an honorable mention at the IEEE VGTC VPG Doctoral Dissertation Award. In 2015 Benjamin was visiting researcher at the University of Washington and Microsoft Research. He has been a PostDoc at Harvard University (Visual Computing Group), Monash University, as well as the Microsoft-Research INRIA Joint Centre. In 2017 Benjamin joined the University of Edinburgh where he is currently a Lecturer in Design Informatics and Visualization.

Benjamin's research designs and investigates interactive information visualization interfaces to help people explore, communicate, and understand data. His research in information visualization is very broad and encompasses network visualization, visualization of spatio-temporal data, data-driven storytelling, visualization in augmented and virtual reality (immersive analytics), nondigital visualization, and teaching and learning visualization. His influential and very original contributions include novel visualization strategies either for specific data (dynamic networks), using novel narrative strategies (data-driven storytelling, data comics), or using advanced display hardware (AR/VR). He is producing excellent research that is backed up with user studies. Recently Benjamin involves himself intensively in applying comics to tell stories about data. Comics are an entertaining and familiar medium, where Benjamin is strongly contributing to enable visualization authoring tools to leverage the expressive power of this communication channel, e.g., designing comic storyboarding tools for presenting dynamic networks.

Benjamin is publishing at an impressive rate, for example with three IEEE TVCG papers in both 2017 and 2018, and one already in 2019. He is also strongly present in the HCI community, for ex-

ample with several contributions at CHI 2019. Many of his very well cited papers are published in IEEE TVCG, EuroVis, Computer Graphics Forum, and CHI. He is active and highly visible in our and neighboring research communities, for example as ACM CHI Paper Associate Chair, IEEE InfoVis Program Committee member, IEEE VAST Program Committee member, and TransImage Conference Co-chair, all in 2018.

A research highlight of Benjamin's career is the 2018 Capital Grant from the UK Engineering and Physical Sciences Research Council (EPSRC) "VisHub: A Collaborative Data Visualization Space for Interdisciplinary Research, Teaching, and Public Engagement". He has already received various awards for his innovative research work. He is internationally very well connected and publishes with a wide variety of top experts in the field.

Eurographics is pleased to recognize Benjamin Bach with the 2019 Young Researcher Award.

Eurographics Young Researcher Award 2019: Matthias Niessner

Matthias Niessner obtained his PhD in 2013 from the University of Erlangen-Nuremberg. He spent 2013-2017 at Stanford University as a Visiting Assistant Professor and has started a professor position at TUM Munich in 2017, where he established the Visual Computing Group. He is also co-founder and director of Synthesis Inc., a startup that aims to empower storytellers with AI-driven video synthesis.

Matthias is a highly prolific researcher with an outstanding publication record in the fields of computer graphics, computer vision, and machine learning. His early work pioneered new methods for subdivision surfaces with a particular focus on real-time rendering using modern GPU, culminating in his PhD thesis entitled "Rendering Subdivision Surfaces using Hardware Tessellation".

He then pivoted his research focus to the topic of 3D reconstruction from various forms of image, video, and depth input data. His early work on real-time 3D reconstruction introduced an online system based on spatial hashing to adaptively distribute computational resources where most effective. He continues to innovate in the domain of 3D reconstruction with highly efficient and robust algorithms for challenging and ill-posed problems for static and dynamic scene reconstruction. One specific focus of his work in this domain is on human modeling, with several outstanding contributions on human face modeling, such as the Face2Face framework that set new standards in real-time face capture and reenactment and has been covered widely in the popular press and TV. More recently, he has made significant contributions to the field of applied machine learning for graphics and vision, in particular using deep learning methods to address such fundamental tasks as scene classification and segmentation, hole filling, or forgery detection.

Matthias has won several past paper awards and the 2016 ACM SIGGRAPH E-Tech Award for best live demo. Since 2017 he is a TUM-IAS Rudolph Moessbauer Fellow, he received the Google Faculty Award for Machine Perception in 2017, the Nvidia Professor Partnership Award in 2018, and an ERC Starting Grant in 2018.

Matthias has an outstanding record of scientific achievements, including 24 ACM TOG papers, and only continues to accelerate. Just this year, he has five oral presentations at CVPR as another sign of incredible productivity at the highest level. His work has been highly influential and inspired numerous other researchers at the interface of graphics, vision, and AI.

Eurographics is pleased to recognize Matthias Niessner with the 2019 Young Researcher Award.

Creation and Exploration of Reality-based Models

Enrico Gobbetti

Director of Visual Computing CRS4, Italy (http://www.crs4.it/vic/)

these technologies have been used in as diverse real-world applications as internet geoviewing, scientific data analysis, surgical training, and cultural heritage study and dissemination.

Enrico has (co-)authored over 200 papers in visualization and computer graphics, six of which received best paper awards. He regularly serves the scientific community through participation in editorial boards, conference committes, and working groups, as well as through the organization and chairing of conferences. He is a Fellow of Eurographics.

Abstract

The last two decades have seen impressive advances in computer vision, computer graphics, and user interface methods and technologies for creating and exploring high-quality 3D digital replicas of real-world objects. In this talk, I will reflect on the successes, limitations, and challenges of applying these research results in practice, with particular emphasis on the cultural heritage domain. I will also lay out research opportunities lying ahead (or behind us).

About the Speaker

Enrico Gobbetti is the director of Visual Computing at the Center for Advanced Studies, Research, and Development in Sardinia (CRS4), Italy. He holds an Engineering degree (1989) and a Ph.D. degree (1993) in Computer Science from the Swiss Federal Institute of Technology in Lausanne (EPFL). His main research interests span many areas of visual computing, with emphasis on scalable technology for acquisition, storage, processing, distribution, and interactive exploration of complex objects. Systems based on

Computational and Data-Driven Design for Manufacturing

Bernd Bickel

Head of the Computer Graphics and Digital Fabrication Group
Institute of Science and Technology Austria (IST Austria).
(https://ist.ac.at/research/research-groups/bickel-group/)

About the Speaker

Bernd Bickel is an assistant professor heading the Computer Graphics and Digital Fabrication Group at the Institute of Science and Technology Austria (IST Austria). He is a computer scientist interested in computer graphics and its overlap with animation, robotics, materials science, and digital fabrication. His main objective is to develop new techniques for efficient design, simulation, and physical reproduction of digital content. Bernd obtained his master's degree in computer science from ETH Zurich in 2006 and graduated with a PhD from ETH Zurich in 2010 where he worked in the computer graphics laboratory with Markus Gross. From 2011 to 2012, Bernd was a visiting professor at the Technical University of Berlin, and in 2012, he became a research scientist and research group leader at Disney Research. In early 2015, he joined IST Austria. He received the ETH Medal for Outstanding Doctoral Thesis in 2011, the Eurographics Best PhD Award in 2012, the Microsoft Visual Computing Award in 2015, an ERC Starting Grant in 2016, the ACM SIGGRAPH Significant New Researcher Award in 2017, and a technical achievement award from the Academy of Motion Picture Arts and Sciences in 2019.

Abstract

Advanced fabrication techniques have grown in sophistication over the last decade, vastly extending the scope of structures and materials that can be fabricated. While new opportunities have emerged for the manufacturing of customized shapes, architected materials with novel functionalities, and active composites that can sense and respond to their environment, their potential impact is limited by the lack of efficient computational approaches for design.

In this talk, I will describe the recent progress in computational fabrication toward novel concepts for modeling, designing, and reproducing objects with nontrivial shapes, topologies, and functionalities. I will reflect on the successes and challenges of computational fabrication and discuss opportunities for further work in this area.

Predictive Simulation for Films, Fashion, and Physics

Florence Bertails-Descoubes

Head of the modELisation de l'Apparence des phénomènes Non-linéaires (ELAN) team
INRIA Grenoble Rhône-Alpes / LJK
(https://team.inria.fr/elan)

About the Speaker

Florence Bertails-Descoubes is a tenured researcher at Inria in Grenoble, France, heading the ELAN research team in physics-based simulation. She received in 2002 a MSc in Image, Vision and Robotics and completed in 2006 a PhD on hair simulation at INP Grenoble, which was awarded the national SPECIF prize from the French community in Computer Science. In 2006-2007, F. Bertails-Descoubes worked at the University of British Columbia as a post-doctoral researcher before joining Inria in September 2007 as a permanent researcher in the BiPop research team, specialized in non-smooth mechanics. In 2017 she has founded the ELAN research team at Inria, positioned across Computer Graphics and Computational Mechanics. F. Bertails-Descoubes's research interests deal with the modeling and the simulation of complex mechanical objects, mainly for applications in digital movies and virtual prototyping. In particular, she is interested in the modeling of nonlinear slender elastic structures (such as rods and plates), the discrete handling of dry frictional contact for modeling heterogeneous materials (such as hair or granulars), and inverse elastic design. She regularly presents her work at premier international conferences in Computer Graphics such as ACM SIGGRAPH or Eurographics, and occasionally in Computational Mechanics and Physics since a few years. In 2014 she received an ERC starting grant to work on inverse elastic design in the presence of frictional contact.

Abstract

In the last decades, physics-based simulation in Computer Graphics has become instrumental in capturing fascinating mechanical phenomena such as cloth folding, ribbon coiling, plant growth, granular flowing, or hair entangling. Complex simulations not only enrich the visual appearance of animations in feature films, but also give the hope in the near future to quickly prototype challenging systems involving post-buckling or collective behaviors, such as virtual garment and hairstyle try-on systems. In soft matter physics, simulation is also on its ways to becoming a fundamental tool for improving our understanding of physical phenomena unexplored so far, and for designing new materials with controlled properties.

In this talk I will show that although building a simulator that is both predictive and scalable remains an open challenge, advances towards this goal can be made possible thanks to a pluridisciplinary modeling approach combining skills across Mechanics and Physics, Applied Mathematics, and Computer Science.