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| Reininghaus, Jan | Tietjen, Christian | Ziemkiewicz, Caroline |
| Reiterer, Harald | Trimm, David | Zobel, Valentin |
| Ren, Donghao | Turkay, Cagatay | |

Author Index

- Abdul-Rahman Alfié 261
Aboulhassan Amal 401
Abowd Gregory D. 51
Agus Marco 41
Alam Md. Jawaherul 351
Alim Usman R. 101
Amassian Aram 401
Ament Marco 491
Andrienko Gennady 181
Andrienko Natalia ... 181, 421
Aupetit Michael 201
Auzinger Thomas 91
Bach Benjamin 31
Baum Daniel 401
Biswas Ayan 81
Bittig Arne T. 421
Boy Jeremy 461
Breeuwer Marcel 11
Bremer Peer-Timo 271
Bruckner Stefan 91, 381
Buchin Kevin 361
Buchmüller Juri 181
Butler Lee A. 391
Bußler Michael 141
Byška Jan 1
Börner Katy 441
Cai Li-Le 121
Cano Rafael G. 361
Carpendale Sheelagh 231
Carr Hamish 241
Castermans Thom 361
Chattopadhyay Amit 241
Chen Chun-Ming 81
Chen Min 261
Chen Yi-Cheng 171
Cherng Fu-Yin 501
Chui Chee-Kong 121
Comba João L. D. 161
Cornel Daniel 331
Dachsbacher Carsten 491
Dal Sasso Freitas Carla M. 461
Dasgupta Aritra 341
Delrieux Claudio 381
Diehl Alexandra 381
Dimitrova Nevena 51
Dinh CuongViet 11
Dinkla Kasper 311
Doraiswamy Harish 161
Dragicevic Pierre 461
Dransch Doris 411
Drucker Steven 301
Dwyer Tim 31
Elmongui Hicham G. 251
Elshehaly Mai 251
Errington Rachel J. 21
Ertl Thomas 141
Fekete Jean-Daniel ... 31, 461
Fernandez Roland 301
Freire Juliana 161
Froehlich Bernd 61
Fuchs Georg 181
Gad Mohamed 251
Ganapathysubramanian B. 401
Geng Zhao 241
Ghobadi Ghazaleh 11
Gobbetti Enrico 41
Gosink Luke 341
Grabowski Thomas 31
Gračanin Denis 251
Grottel Sebastian 151
Gröller Eduard ... 1, 331, 381
Gumhold Stefan 151
Günther Tobias 471
Hadwiger Markus 401
Halperin Daniel 71
Hansen Charles 391
Han Yi 51
Harrison Lane 221
Heer Jeffrey 71, 301
Heide Ulke A. van der ... 11
Henry-Riche N. ... 31, 301, 311
Hochstetter Hendrik 481
Horváth Zsolt 331
House Donald H. 371
Howe Bill 71
Ho Hsin-Yang 501
Huang Wei-Xiang 171
Huron Samuel 231
Janetzko Halldor 181
Jianu Radu 451
Joia Paulo 281
Jurčik Adam 1
Kairam Sanjay 301
Kallehauge Jesper Follsted .. 11
Kanjana Bose Rassadarie .. 261
Karimov Alexey 91
Keim Daniel A. 181, 211
Kemmler Fritz 291
Kerzner Ethan 391
Khan Imtiaz A. 21
Kirby Robert M. 371
Kirschke Marco 291
Knoll Aaron 241
Kobourov Stephen G. 351, 441
Kolb Andreas 481
Konev Artem 331
Kosara Robert 221, 341
Kozlíková Barbora 1
Köthür Patrick 411
Lai Yu-Chi 501
Lehmann Dirk J. 291
Leitte Heike 431
Lin Hai 131
Lin I-Chen 171
Lin Wen-Chieh 171, 501
Liu Le 371
Liu Shusen 271
Liu Xiaoyang 101
Luboschik Martin 421
Madhyastha Tara 31
Marton Fabio 41
Marwan Norbert 411
Matković Kresimir 251

| | | | | | |
|------------------------|-----|--------------------------|-----|--------------------------|----------|
| Melançon Guy | 321 | Rozga Agata | 51 | Theisel Holger | 291, 471 |
| Meyer Miriah | 391 | Ruiz Juan | 381 | Thiagarajan Jayaraman J. | 271 |
| Michels Steffen | 191 | Röhlig Martin | 421 | Tierny Julien | 241 |
| Mirzargar Mahsa | 371 | Sadlo Filip | 141 | Tominski Christian | 421 |
| Mistelbauer Gabriel | 91 | Sadransky Bernhard | 331 | Veeramoni Sankar | 351 |
| Mittelstädt Sebastian | 211 | Saket Bahador | 441 | Vilanova Anna | 11 |
| Moritz Dominik | 71 | Saulo Celeste | 381 | Viola Ivan | 1 |
| Munzner Tamara | 321 | Scheepens Roeland | 191 | Vo Huy T. | 161 |
| Nguyen Binh P. | 121 | Scheidegger Carlos | 441 | Walny Jagoda | 231 |
| Nonato Luis Gustavo | 281 | Schinkel Stefan | 411 | Wang Bei | 271 |
| Okoe Mershack | 451 | Schultz Thomas | 111 | Wang Qichao | 131 |
| Ong Sim-Heng | 121 | Schumann Heidrun | 421 | Wang Yu-Shuen | 171 |
| Pascucci Valerio | 271 | Sedlmair Michael | 201 | Waser Jürgen | 331 |
| Pelorosso Leandro | 381 | Silva Cláudio T. | 161 | Wei Tzu-Hsuan | 81 |
| Petronetto Fabiano | 281 | Sips Mike | 411 | Westenberg Michel A. | 311 |
| Pieterse Astrid | 361 | Skau Drew | 221 | Wetering Huub van de | 191 |
| Poco Jorge | 161 | Sonke Willem | 361 | Whitaker Ross | 371 |
| Potthast Martin | 61 | Soundararajan Krishna P. | 111 | Wijk Jarke J. van | 191 |
| Pretorius A. Johannes | 21 | Speckmann Bettina | 361 | Witt Carl | 411 |
| Raidou Renata Georgia | 11 | Staib Joachim | 151 | Wodo Olga | 401 |
| Renoust Benjamin | 321 | Stasko John | 51 | Wurm Maximilian | 481 |
| Rieck Bastian | 431 | Stein Benno | 61 | Yeh I-Cheng | 501 |
| Riehmman Patrick | 61 | Suslik Spritzer Andre | 461 | Zhyhalava Tatsiana | 291 |
| Rodriguez Marcos Balsa | 41 | Tao Yubo | 131 | Zirr Tobias | 491 |

TABLE OF CONTENTS

Biomedical Visualization

- MoleCollar and Tunnel Heat Map Visualizations for Conveying Spatio-Temporo-Chemical Properties Across and Along Protein Voids* 1
Jan Byška, Adam Jurčík, M. Eduard Gröller, Ivan Viola, and Barbora Kozlíková
- Visual Analytics for the Exploration of Tumor Tissue Characterization* 11
Renata Georgia Raidou, Uulke A. van der Heide, Cuong Viet Dinh, Ghazaleh Ghobadi, Jesper Follsted Kallehauge, Marcel Breeuwer, and Anna Vilanova
- Cell Lineage Visualisation* 21
A. Johannes Pretorius, Imtiaz A. Khan, and Rachel J. Errington
- Small MultiPiles: Piling Time to Explore Temporal Patterns in Dynamic Networks* 31
Benjamin Bach, Nathalie Henry-Riche, Tim Dwyer, Tara Madhyastha, Jean-Daniel Fekete, and Thomas Grabowski

Text & Humanities

- Adaptive Recommendations for Enhanced Non-linear Exploration of Annotated 3D Objects* 41
Marcos Balsa Rodriguez, Marco Agus, Fabio Marton, and Enrico Gobbetti
- Visual Analysis of Proximal Temporal Relationships of Social and Communicative Behaviors* 51
Yi Han, Agata Rozga, Nevena Dimitrova, Gregory D. Abowd, and John Stasko
- Visual Assessment of Alleged Plagiarism Cases* 61
Patrick Riehmann, Martin Potthast, Benno Stein, and Bernd Froehlich
- Perfopicon: Visual Query Analysis for Distributed Databases* 71
Dominik Moritz, Daniel Halperin, Bill Howe, and Jeffrey Heer

Volume Analysis and Classification

- Efficient Local Histogram Searching via Bitmap Indexing* 81
Tzu-Hsuan Wei, Chun-Ming Chen, and Ayan Biswas
- Guided Volume Editing based on Histogram Dissimilarity* 91
Alexey Karimov, Gabriel Mistelbauer, Thomas Auzinger, and Stefan Bruckner
- Compressive Volume Rendering* 101
Xiaoyang Liu and Usman R. Alim
- Learning Probabilistic Transfer Functions: A Comparative Study of Classifiers* 111
Krishna Prasad Soundararajan and Thomas Schultz

Volume Rendering

- Rule-Enhanced Transfer Function Generation for Medical Volume Visualization* 121
Li-Le Cai, Binh P. Nguyen, Chee-Kong Chui, and Sim-Heng Ong
- Edge-Aware Volume Smoothing Using L_0 Gradient Minimization* 131
Qichao Wang, Yubo Tao, and Hai Lin

TABLE OF CONTENTS

| | |
|--|-----|
| <i>Photoelasticity Raycasting</i> | 141 |
| Michael Bußler, Thomas Ertl, and Filip Sadlo | |
| <i>Visualization of Particle-based Data with Transparency and Ambient Occlusion</i> | 151 |
| Joachim Staib, Sebastian Grottel, and Stefan Gumhold | |
| Traffic | |
| <i>Exploring Traffic Dynamics in Urban Environments Using Vector-Valued Functions</i> | 161 |
| Jorge Poco, Harish Doraiswamy, Huy T. Vo, João L. D. Comba, Juliana Freire, and Cláudio T. Silva | |
| <i>Interactive Visual Analysis for Vehicle Detector Data</i> | 171 |
| Yi-Cheng Chen, Yu-Shuen Wang, Wen-Chieh Lin, Wei-Xiang Huang, and I-Chen Lin | |
| <i>Visual Analytics for Exploring Local Impact of Air Traffic</i> | 181 |
| Juri Buchmüller, Halldor Janetzko, Gennady Andrienko, Natalia Andrienko, Georg Fuchs, and Daniel A. Keim | |
| <i>Rationale Visualization for Safety and Security</i> | 191 |
| Roeland Scheepens, Steffen Michels, Huub van de Wetering, and Jarke J. van Wijk | |
| Evaluation and Design | |
| <i>Data-driven Evaluation of Visual Quality Measures</i> | 201 |
| Michael Sedlmair and Michael Aupetit | |
| <i>Efficient Contrast Effect Compensation with Personalized Perception Models</i> | 211 |
| Sebastian Mittelstädt and Daniel A. Keim | |
| <i>An Evaluation of the Impact of Visual Embellishments in Bar Charts</i> | 221 |
| Drew Skau, Lane Harrison, and Robert Kosara | |
| <i>An Exploratory Study of Data Sketching for Visual Representation</i> | 231 |
| Jagoda Walny, Samuel Huron, and Sheelagh Carpendale | |
| Multi-modal and Multi-field | |
| <i>Fiber Surfaces: Generalizing Isosurfaces to Bivariate Data</i> | 241 |
| Hamish Carr, Zhao Geng, Julien Tierny, Amit Chattopadhyay, and Aaron Knoll | |
| <i>Interactive Fusion and Tracking For Multi-Modal Spatial Data Visualization</i> | 251 |
| Mai Elshehaly, Denis Gračanin, Mohamed Gad, Hicham G. Elmongui, and Kresimir Matković | |
| High-dimensional Visualization | |
| <i>A Multi-task Comparative Study on Scatter Plots and Parallel Coordinates Plots</i> | 261 |
| Rassadarie Kanjanabose, Alfie Abdul-Rahman, and Min Chen | |
| <i>Visual Exploration of High-Dimensional Data through Subspace Analysis and Dynamic Projections</i> | 271 |
| Shusen Liu, Bei Wang, Jayaraman J. Thiagarajan, Peer-Timo Bremer, and Valerio Pascucci | |

TABLE OF CONTENTS

| | |
|---|-----|
| <i>Uncovering Representative Groups in Multidimensional Projections</i> | 281 |
| Paulo Joia, Fabiano Petronetto, and Luis Gustavo Nonato | |
| <i>Visualnostics: Visual Guidance Pictograms for Analyzing Projections of High-dimensional Data</i> | 291 |
| Dirk J. Lehmann, Fritz Kemmler, Tatsiana Zhyhalava, Marco Kirschke, and Holger Theisel | |
| Graphs | |
| <i>Refinery: Visual Exploration of Large, Heterogeneous Networks through Associative Browsing</i> | 301 |
| Sanjay Kairam, Nathalie Henry Riche, Steven Drucker, Roland Fernandez, and Jeffrey Heer | |
| <i>Dual Adjacency Matrix: Exploring Link Groups in Dense Networks</i> | 311 |
| Kasper Dinkla, Nathalie Henry Riche, and Michel A. Westenberg | |
| <i>Detangler: Visual Analytics for Multiplex Networks</i> | 321 |
| Benjamin Renoust, Guy Melançon, and Tamara Munzner | |
| Geospatial Visualization | |
| <i>Visualization of Object-Centered Vulnerability to Possible Flood Hazards</i> | 331 |
| Daniel Cornel, Artem Konev, Bernhard Sadransky, Zsolt Horváth, Eduard Gröller, and Jürgen Waser | |
| <i>VIMTEX: A Visualization Interface for Multivariate, Time-Varying, Geological Data Exploration</i> | 341 |
| Aritra Dasgupta, Robert Kosara, and Luke Gosink | |
| <i>Quantitative Measures for Cartogram Generation Techniques</i> | 351 |
| Md. Jawaherul Alam, Stephen G. Kobourov, and Sankar Veeramoni | |
| <i>Mosaic Drawings and Cartograms</i> | 361 |
| Rafael G. Cano, Kevin Buchin, Thom Castermans, Astrid Pieterse, Willem Sonke, and Bettina Speckmann | |
| Engineering and Physical Sciences | |
| <i>Visualizing Time-Specific Hurricane Predictions, with Uncertainty, from Storm Path Ensembles</i> | 371 |
| Le Liu, Mahsa Mirzargar, Robert M. Kirby, Ross Whitaker, and Donald H. House | |
| <i>Visual Analysis of Spatio-Temporal Data: Applications in Weather Forecasting</i> | 381 |
| Alexandra Diehl, Leandro Pelorosso, Claudio Delrieux, Celeste Saulo, Juan Ruiz, M. Eduard Gröller, and Stefan Bruckner | |
| <i>A Shot at Visual Vulnerability Analysis</i> | 391 |
| Ethan Kerzner, Lee A. Butler, Charles Hansen, and Miriah Meyer | |
| <i>A Novel Framework for Visual Detection and Exploration of Performance Bottlenecks in Organic Photovoltaic Solar Cell Materials</i> | 401 |
| Amal Aboulhassan, Daniel Baum, Olga Wodo, Baskar Ganapathysubramanian, Aram Amassian, and Markus Hadwiger | |

TABLE OF CONTENTS

Time-series and Topology

- Visual Analytics for Correlation-Based Comparison of Time Series Ensembles* 411
Patrick Köthur, Carl Witt, Mike Sips, Norbert Marwan, Stefan Schinkel, and Doris Dransch
- Feature-Driven Visual Analytics of Chaotic Parameter-Dependent Movement* 421
Martin Luboschik, Martin Röhlrig, Arne T. Bittig, Natalia Andrienko, Heidrun Schumann, and Christian Tominski
- Persistent Homology for the Evaluation of Dimensionality Reduction Schemes* 431
Bastian Rieck and Heike Leitte

Evaluation of Graphs

- Map-based Visualizations Increase Recall Accuracy of Data* 441
Bahador Saket, Carlos Scheidegger, Stephen G. Kobourov, and Katy Börner
- GraphUnit: Evaluating Interactive Graph Visualizations Using Crowdsourcing* 451
Mershack Okoe and Radu Jianu
- Towards a Smooth Design Process for Static Communicative Node-link Diagrams* 461
Andre Suslik Spritzer, Jeremy Boy, Pierre Dragicevic, Jean-Daniel Fekete, and Carla Maria Dal Sasso Freitas

Flow Visualization

- Finite-Time Mass Separation for Comparative Visualizations of Inertial Particles* 471
Tobias Günther and Holger Theisel
- Vector Field Visualization of Advective-Diffusive Flows* 481
Hendrik Hochstetter, Maximilian Wurm, and Andreas Kolb
- Visualization of Coherent Structures of Light Transport* 491
Tobias Zirr, Marco Ament, and Carsten Dachsbacher
- Evaluating 2D Flow Visualization Using Eye Tracking* 501
Hsin-Yang Ho, I-Cheng Yeh, Yu-Chi Lai, Wen-Chieh Lin, and Fu-Yin Cherng

Keynote – Analysis and Visualization of Urban Data

Claudio T. Silva

Professor of Computer Science and Engineering and Data Science, New York University

Abstract

Today, 50% of the world's population lives in cities and the number will grow to 70% by 2050. Cities are the loci of economic activity and the source of innovative solutions to 21st century challenges. At the same time, cities are also the cause of looming sustainability problems in transportation, resource consumption, housing affordability, and inadequate or aging infrastructure. The large volumes of urban data, along with vastly increased computing power and improved user interfaces enable analysts to better understand cities. Encouraging success stories show better operations, more informed planning, improved policies, and a better quality of life for citizens. However, analyzing urban data often requires a staggering amount of work, from identifying relevant data sets, cleaning and integrating them, to performing exploratory analyses over complex, spatio-temporal data. Our long-term goal is to enable interdisciplinary teams to crack the code of cities by freely exploring the vast amounts of data cities generate. This talk describes challenges which have led us to fruitful research on data management, data analysis, and visualization techniques. I will present methods and systems we have developed to increase the level of interactivity, scalability, and usability for spatio-temporal analyses. This work was supported in part by the National Science Foundation, the Moore-Sloan Data Science Environment at NYU, IBM Faculty Awards, AT&T, NYU School of Engineering and Center for Urban Science and Progress.

Short Biography

Claudio Silva is a Professor of Computer Science and Engineering and Data Science at New York University. Claudio's research lies in the intersection of visualization, data analysis, and geometric computing, and recently he has been interested in the analysis of urban data. He coauthored more than 200 technical papers and 12 U.S. patents, primarily in visualization, geometry processing, computer graphics, scientific data management, HPC, and related areas. He has served on more than 100 program committees, and he is currently on the editorial board of the ACM Transactions on Spatial Algorithms and Systems, IEEE Transactions on Big Data, Computing in Science and Engineering, Computer and Graphics, The Visual Computer, and Graphical Models. He was general co-chair of IEEE VisWeek 2010, and papers co-chair of IEEE Visualization 2005 and 2006. He received four IBM Faculty Awards, and 12 best paper awards. He is an IEEE Fellow and received the 2014 IEEE VGTC Visualization Technical Achievement Award.

Keynote – Whole Brain Optical Imaging

Francesco S. Pavone

Professor, Department of Physics and Astronomy, University of Florence
Director, European Laboratory for Non Linear Spectroscopy in Florence

Abstract

We are interested in the correlation between morphology of brain connections and functionality, which is one of the major neuroscience issues in the comprehension of many pathologies and mechanisms of behavior and computation. Elucidating the neural pathways that underlie brain function is also one of the greatest challenges in neuroscience. Nowadays, there are several imaging techniques offering a complementary approach to capture and visualize intact neural networks. Each of those offers a different strategy and furnish complementary information on the role of neural components. We will describe different approaches enabling to move from single neuron details to whole brain imaging both on functional and morphological point of views. Some examples of correlative microscopy, combining linear and non linear techniques will be described. Particular attention will be devoted to neural plasticity after damage as neurobiological application.

Short Biography

Francesco Saverio Pavone is directing a research group working in the field of biophotonics on single molecule biophysics, microscopy imaging-spectroscopy techniques, biomedical imaging, and laser manipulation of bio-samples. In particular, he is developing new microscopy techniques for high resolution and high sensitivity imaging, and for laser manipulation purposes. These techniques have been applied to single molecule biophysics, single cell imaging and optical manipulation. Tissue imaging is another research area developed, where non linear optical techniques have been applied to skin and neural tissue imaging. Also, In-Vivo imaging apparatus have been developed and applied to animal and humans. Pavone is author of many international articles and editor of international books. He has given more than 70 invited talk and he is editor of major international journals. He coordinates several European projects and he has organized several international congresses; he is also director of the European Laboratory for Non Linear Spectroscopy in Florence.