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2018

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4. — 8. 6. 2018

20th EG/VGTC

Conference on Visualization

Brno, Czech Republic

Table of Contents

Welcome to EuroVis 2018

Dear EuroVis participants,

On behalf of the steering committee, organization committee, and local organizing institution, let me cordially welcome you in beautiful Brno at the 20th anniversary of EuroVis, the EG/VGTC Conference on Visualization. It is hosted by the Faculty of Informatics at the Masaryk University, organized by the Eurographics Working Group on Data Visualization, and supported by the IEEE Visualization and Graphics Technical Committee.

We hope that you will enjoy the scientific program of the co-located workshops and conference, as well as the social events. We prepared the conference with love and we wish you to have the same feelings for EuroVis. Enjoy the stay in Brno. We are happy to have you here!

Barbora Kozlíková
EuroVis 2018 Chair
Faculty of Informatics
Masaryk University
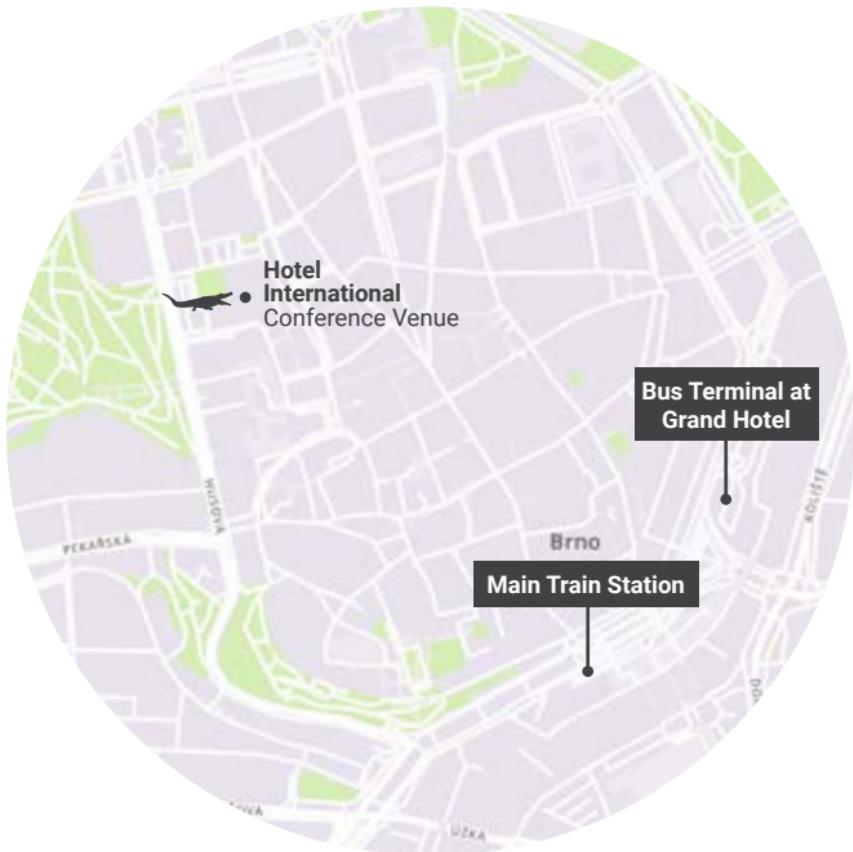
Venue Overview
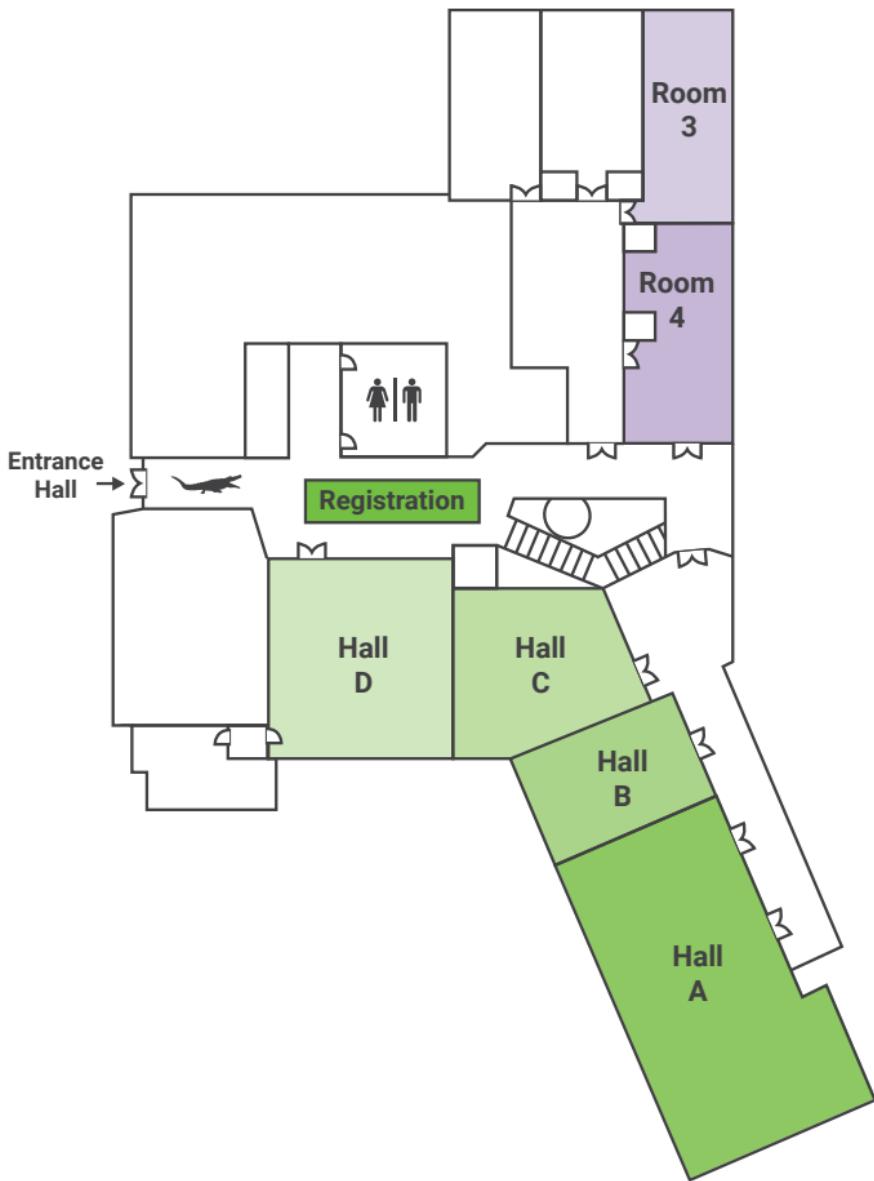
EuroVis 2018 and all co-located events will take place in **Hotel International** in the historical center of Brno. The walking time from the venue to the main train station and the bus terminal at Grand Hotel is about 15 minutes.

Hotel International
Husova 16

Venue Map

Room 3

Room 4

Entrance Hall →

Registration

Hall D

Hall C

Hall B

Hall A

Program Overview

	Monday 4.6.		Tuesday 5.6.			Wednesday 6.6.		
	Foyer Hall D		**Foyer Hall D**			**Foyer Hall D**		
08.00 — 09.00	Registration	08.00 — 09.00	Registration		08.00 — 09.00	Registration		
	Rooms 3+4, Halls A, B, C, D		Hall A			Hall A		Hall D
09.00 — 10.40	Parallel Workshops	09.40 — 11.20	Keynote Drew Berry		09.00 — 10.40	FP IV		FP V
10.40 — 11.10	Coffee Break	11.20 — 11.30	Short Break		10.40 — 11.10	Coffee Break		
	Rooms 3+4, Halls A, B, C, D		Hall A			Hall A	Hall D	Rooms 3+4
11.10 — 12.50	Parallel Workshops	11.30 — 12.50	Fast Forwards		11.10 — 12.50	FP VI	SP II	STAR II
12.50 — 14.20	Lunch Break	12.50 — 14.20	Lunch Break		12.50 — 14.20	Lunch Break		
	Rooms 3+4, Halls A, B, C, D		Hall A	Hall D		Hall A		Hall D
14.20 — 16.00	Parallel Workshops	14.20 — 16.00	FP I	FP II	14.20 — 16.00	FP VII		FP VIII
16.00 — 16.30	Coffee Break	16.00 — 16.30	Coffee Break		16.00 — 16.30	Coffee Break		
	Rooms 3+4, Halls A, B, C, D		Hall A	Hall D	Rooms 3+4		Hall A	Hall D	Rooms 3+4
16.30 — 18.10	Parallel Workshops	16.30 — 18.10	FP III	SP I	STAR I	16.30 — 18.10	FP IX	SP III	STAR III
	Museum of Applied Arts		**Halls B+C**			**Boulevard Restaurant**		
19.00	Workshops Reception	19.00	Welcome Reception and Poster Session		20.00	Pre-EuroVis 2019 Party		

Program Overview

Thursday 7.6.			Friday 8.6.	
Foyer Hall D			**Foyer Hall D**	
08.00 — 09.00	**Registration**		09.00 — 09.30	**Registration**
	Hall A	**Hall D**		**Hall A**
09.00 — 10.40	**FP X**	**FP XI**	09.30 — 11.10	**Capstone Daniel Sykora**
10.40 — 11.10	**Coffee Break**		11.10 — 12.00	**Awards Closing**
	Hall A	**Hall D**	**Rooms 3+4**	
11.10 — 13.10	**FP XII**	**SP IV**	**STAR IV**	
13.10 — 14.20	**Lunch Break**			
	Hall A	**Hall D**		
14.20 — 16.00	**FP XIII**	**STAR V**		
16.00 — 16.30	**Coffee Break**			
	Hall A	**Hall D**		
16.30 — 18.10	**FP XIV**	**IND**		
Mendel Museum				
20.00	**Conference Dinner**			

Co-located Events

Several co-located events are traditionally organized along with the EuroVis conference. This year, there will be one co-located conference, one tutorial, and four workshops.

EGPGV

Rooms 3+4

EGPGV'18 is the 18th Eurographics Symposium on Parallel Graphics and Visualization. The aim of this symposium is to foster the exchange of experiences and knowledge exploiting and defining new trends in parallel graphics and visualization. The importance of parallel computing is increasing rapidly with the ubiquitous availability of multi-core CPUs, GPUs, and cluster systems. Computationally demanding and data-intensive applications in graphics and visualization are strongly affected by this trend and require novel, efficient parallel solutions.

EuroVA

Hall A

EuroVA 2018 is the ninth international EuroVis workshop on Visual Analytics. Visual Analytics is a problem-solving and sense-making technology that integrates analytical computations, visual representations, and interaction. It includes the analysis of complex (massive, dynamic, ambiguous, conflicting…) data and information for gaining understanding, building knowledge, and

inferring insight. Visual Analytics aims at a synergistic collaboration of humans and computers mediated through interactive visual interfaces.

EuroRV3

Hall B

The sixth EuroRVVV (EuroVis Workshop on Reproducibility, Verification, and Validation in Visualization) workshop was co-organized by Noeska Smit (University of Bergen, Norway), Kai Lawonn (University of Koblenz — Landau, Germany), Lars Linsen (Universität Münster, Germany), and Robert Kosara (Tableau). The call for papers this year focused on the topic of 'Uncertainty in Visualization'. Submitted papers underwent a one-stage peer-review process, and five papers were accepted for presentation. The full program featured a combination of paper presentations and invited talks.

EnvirVis

Hall C

The EnvirVis workshop addresses the visualization needs for environmental research. Its goal is to raise awareness to the importance of visualization in geosciences and to establish a forum for interdisciplinary discussions. Not only that research in environmental sciences has become more and more important as we are faced with increasing problems concerning climate change, water scarcity, pollution

Co-located Events

of the environment and changes in biodiversity. In addition, the amount of data obtained from complex monitoring, remote sensing, statistical analysis, and simulation of natural phenomena such as groundwater processes or migration of animal species under changing natural conditions is ever increasing.

Machine Learning Methods in Visualisation for Big Data 2018
1/2 day

On Monday morning, Ian Nabney, Jaakko Peltonen, and Daniel Archambault are organising for a third time the Workshop on Machine Learning Methods in Visualisation. In order to handle big data challenges, machine learning techniques can be advantageous in simplifying and summarising large data sets for visualisation. Machine learning provides methods to summarise very large data sets whereas visualisation leverages the human visual system to help find unanticipated patterns. In this workshop, we discuss effective ways of integrating our two fields.

MolVA: Workshop on Molecular Graphics and Visual Analysis of Molecular Data

1/2 day

Hall D

Molecular visualization is one of the oldest branches of scientific visualization which has been developing for over 50 years. Due to the continuous advances in both computational biology and computer graphics techniques, molecular graphics and visualization are still very active areas of research. Not only the ever-increasing dataset sizes yield a constant challenge for visual analysis, but also technological advances like in web-based graphics or augmented and virtual reality open up new possibilities. In this half-day EuroVis workshop — which is held for the first time — we initiate a multidisciplinary meeting with the aim of bringing together visualization researchers from different areas that work with molecular data. Covered topics in the context of this workshop are: molecular graphics, visual analysis, and visualization of static and dynamic molecular data, as well as standardization approaches for molecular biology.

Sessions: Monday   EGPGV ——— Rooms 3+4

08.00 — 09.00	**Registration**

Session 1: Raytracing

Opening

Direct Raytracing of Particle-based Fluid Surfaces Using Anisotropic Kernels
T. Biedert, J.-T. Sohns, S. Schröder, J. Amstutz, I. Wald, C. Garth

09.00 — 10.40

VisIt-OSPRay: Towards An Exascale Volume Visualization System
Q. Wu, W. Usher, S. Petruzza, S. Kumar, F. Wang, I. Wald, V. Pascucci, C. Hansen

Robust Iterative Find-Next-Hit Ray Traversal
I. Wald, J. Amstutz, C. Benthin

10.40 — 11.10	**Coffee Break**

Session 2: Keynote

Hardware-Accelerated Multi-Tile Streaming for Realtime Remote Visualization
T. Biedert, P. Messmer, T. Fogal, C. Garth

11.10 — 12.50

Keynote: Large-Scale Visualization and Multi-Resolution (GPU) Data Structures
M. Hadwiger

12.50 — 14.20	**Lunch Break**

Session 3: Flow Vis

14.20
—
16.00

Performance-Portable Particle Advection with VTK-m
D. Pugmire, A. Yenpure, M. Kim, J. Kress, H. Childs, B. Hentschel, R. Maynard

Dense Texture Flow Visualization using Data-Parallel Primitives
M. Kim, S. Klasky, D. Pugmire

Revisiting the Evaluation of In Situ Lagrangian Analysis
S. Sane, R. Bujack, H. Childs

Rapid k-d Tree Construction for Sparse Volume Data
S. Zellmann, J. Schulze, U. Lang

16.00
—
16.30

Coffee Break

Session 4: Applications

16.30
—
18.10

Interactive Visual Analysis of Multi-dimensional Metamodels
S. Gebhardt, S. Pick, B. Hentschel, T. W. Kuhlen

La VALSE: Scalable Log Visualization for Fault Characterization in Supercomputers
H. Guo, S. Di, R. Gupta, T. Peterka, F. Cappello

Closing

19.00   **Workshops Reception**   **Museum of Applied Arts**

Sessions: Monday   EuroVA ————— Hall A

| 08.00 — 09.00 | **Registration** |

| 09.00 — 10.40 | **Session 1: Opening & Keynote**
Chair: C. Tominski

Opening

Keynote: Visual Football Analytics
N. Andrienko, G. Andrienko |

| 10.40 — 11.10 | **Coffee Break** |

| 11.10 — 12.50 | **Session 2: Analytics & Guidance**
Chair: R. Ruddle

ComModeler: Topic Modeling Using Community Detection
T. Dang, V. Nguyen

Visual Exploration of Spatial and Temporal Variations of Tweet Topic Popularity
J. Li, S. Chen, G. Andrienko, N. Andrienko

Visual Predictive Analytics using iFuseML
G. Sehgal, M. Rawat, B. Gupta, G. Gupta, G. Sharma, G. Shroff

Guidance or No Guidance? A Decision Tree Can Help
D. Ceneda, T. Gschwandtner, T. May, S. Miksch, M. Streit, C. Tominski |

| 12.50 — 14.20 | **Lunch Break** |

Session 3: Applications
Chair: J. Kohlhammer

14.20 — 16.00

A Visual Analytics System for Managing Mobile Network Failures
M. Angelini, L. Bardone, M. Geymonat, M. Mirabelli, C. Remondino, G. Santucci, B. Stabellini, P. Tamborrini

Personalized Visual-Interactive Music Classification
C. Ritter, C. Altenhofen, M. Zeppelzauer, A. Kuijper, T. Schreck, J. Bernard

A Set-based Visual Analytics Approach to Analyze Retail Data
M. Adnan, R. Ruddle

polimaps: Supporting Predictive Policing with Visual Analytics
F. Stoffel, H. Post, M. Stewen, D. Keim

16.00 — 16.30

Coffee Break

Session 4: Work-in-Progress & Closing
Chair: T. von Landesberger

16.30 — 18.10

Combining the Automated Segmentation and Visual Analysis of Multivariate Time Series
J. Bernard, C. Bors, M. Bögl, C. Eichner, T. Gschwandtner, S. Miksch, H. Schumann, J. Kohlhammer

Towards Visual Cyber Security Analytics for the Masses
A. Ulmer, M. Schufrin, H. Lücke-Tieke, C. D. Kannanayikkal, J. Kohlhammer

A Concept for Consensus-based Ordering of Views
W. Jentner, J. Dominik, U. Engelke, D. Keim, T. Schreck

Best paper award

Closing

19.00 **Workshops Reception** **Museum of Applied Arts**

Sessions: Monday   EuroRV3 ———— Hall B

| 08.00 — 09.00 | Registration |

| 09.00 — 10.40 | **Session 1**
Chair: K. Lawonn

Opening
Keynote: Making Uncertainties Explicit
H.‑C. Hege |

| 10.40 — 11.10 | Coffee Break |

| 11.10 — 12.50 | **Session 2**
Chair: R. Kosara

Invited talk: Visualizing Temporal Uncertainty
T. Gschwandtner
Visual Analytics-enabled Bayesian Network Approach to Reasoning about Public Safety Data
E. Chuprikova, A. MacEachren, J. Cron, L. Meng
Visualizing Uncertainty in Cultural Heritage Collections
F. Windhager, V. A. Filipov, S. Salisu, E. Mayr
Uncertainty Visualization: Recent Developments and Future Challenges in Prostate Cancer Radiotherapy Planning
R. Raidou |

| 12.50 — 14.20 | Lunch Break |

Session 3
Chair: N. Smit

14.20
—
16.00

Invited talk: Perception, Comparison, and Models for Uncertainty
M. Gleicher

Towards Visualizing Subjective Uncertainty: A Conceptual
Framework Addressing Perceived Uncertainty through Action
Randomness
W. Li, M. Funk, A. Brombacher

Uncertainty of Visualizations for SenseMaking in Criminal
Intelligence Analysis
J. Islam, K. Xu

16.00
—
16.30

Coffee Break

16.30
—
18.10

Session 4
Chair: L. Linsen

Keynote: Ensemble Visualization – Visualizing the uncertainty that
is represented by an ensemble of fields
R. Westermann

Closing

19.00   **Workshops Reception**   **Museum of Applied Arts**

08.00 — 09.00	Registration

Session 1: Atmosphere
Chair: K. Rink

09.00 — 10.40	**Opening**
	Interactive Visual Exploration of Teleconnections in Atmospheric Dataset
	A. Antonov, G. Lohmann, M. Ionita, M. Dima, L. Linsen
	Web-based 3D Meteo Visualization: 3D Rendering Farms from a New Perspective
	M. Koutek, I. van der Neut
	Developing a Concept to Visualize Object-based Weather Forecasting Ensembles
	K. Feige, R. Posada, U. Blahak

10.40 — 11.10	Coffee Break

Session 2: Hydrosphere
Chair: S. Jänicke

11.10 — 12.50	**Change Point Detection for Ocean Eddy Analysis**
	D. Banesh, J. Wendelberger, M. Petersen, J. Ahrens, B. Hamann
	Predict Saturated Thickness using TensorBoard Visualization
	V. T. Nguyen, T. Dang
	How To Look at Data: Environmental Practitioners' Lens Through Two Case Studies
	M. Ling, J. Johnson, Z. Feng, J. Chen

12.50 — 14.20	Lunch Break

14.20 — 16.00	**Session 3: Keynote** **Chair: G. Scheuermann** **Keynote: Tales from the Orbit: In Search of the Visual Truth** H. G. Kostis

16.00 — 16.30	**Coffee Break**

16.30 — 18.10	**Session 4: Ecosphere and Infrastructure** **Chair: K. Rink** **TreeeX: Exploring the Diversity of Tree Species** S. Jänicke **Visual Analysis of Urban Traffic Data based on High-Resolution and High-Dimensional Environmental Sensor Data** J. Häußler, M. Stein, D. Seebacher, H. Janetzko, T. Schreck, D. Keim **Visualizing Electric Power Systems as Flow Fields** S. Molnar, K. Gruchalla **What if we use the What if Approach for Eco-Feedback? Designing an Electricity Consumption Analysis for Layman Users** J. Wambecke, G.-P. Bonneau, R. Blanch, R. Vergne **Closing**

19.00	**Workshops Reception**	**Museum of Applied Arts**

Sessions: Monday

Machine Learning Methods in Visualisation for Big Data ——— **Hall D**

08.00 **—** **09.00**	**Registration**

Session 1

09.00 **—** **10.40**	**Opening** **Dimensionality Reduction for Visualization (Tutorial)** J. Peltonen **Sampling Methods and Graph Visualisation (Tutorial)** D. Archambault **Panning for Insight: Amplifying Insight through Tight Integration of Machine Learning, Data Mining, and Visualization (Paper)** B. Karer, I. Scheler, H. Hagen

10.40 **—** **11.10**	**Coffee Break**

Session 2

11.10 **—** **12.50**	**Evaluating Visualisation Techniques (Tutorial)** I. Nabney **Panel Discussion** **Data Lab: Bring Your Own Data** **Closing**

12.50 **—** **14.20**	**Lunch Break**

19.00	**Workshops Reception**	**Museum of Applied Arts**

08.00 — 09.00	**Registration**

Session 1: Computational Analysis of Dynamic Molecular Data
Chairs: J. Byška, M. Krone

14.20 — 16.00

Opening

Keynote: Visualization Challenges and Opportunities Posed by Petascale Molecular Dynamnics Simulations
J. E. Stone

An Accelerated Online PCA with O(1) Complexity for Learning Molecular Dynamics Data
S. Alakkari, J. Dingliana

Atomic Accessibility Radii for Molecular Dynamics Analysis
N. Lindow, D. Baum, H.-C. Hege
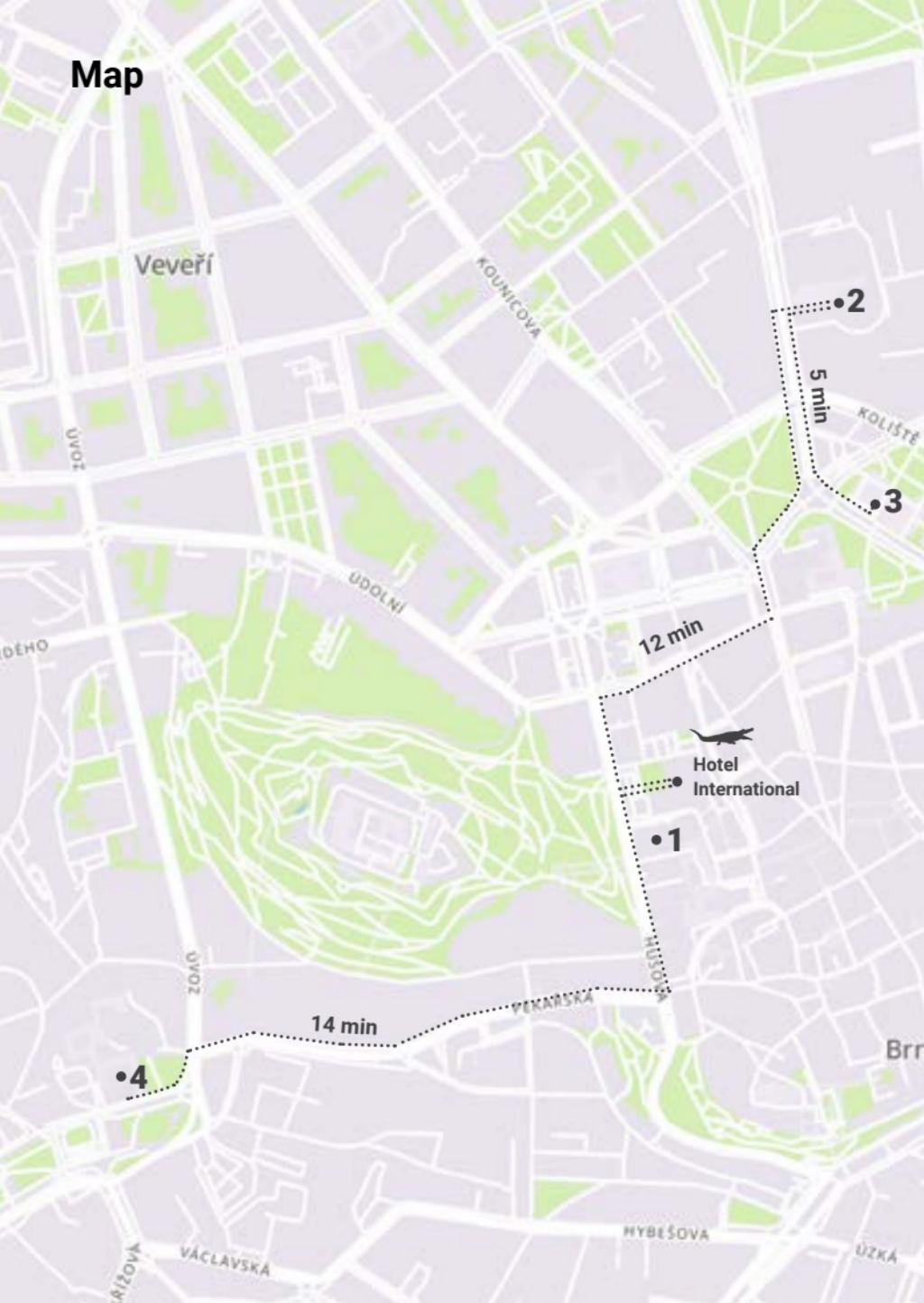
16.00 — 16.30	**Coffee Break**

Session 2: Frameworks for Molecular Data Visualization
Chair: B. Sommer

16.30 — 18.10

VIA-MD: Visual Interactive Analysis of Molecular Dynamics
R. Skånberg, M. Linares, C. Konig, P. Norman, D. Jönsson, I. Hotz, A. Ynnerman

Mol*: Towards a Common Library and Tools for Web Molecular Graphics
D. Sehnal, A. Rose, J. Koca, S. Burley, S. Velankar

Keynote: Visualizing Biomolecular Structures for Research and Outreach
S. O'Donoghue

**Closing**

19.00	**Workshops Reception**	**Museum of Applied Arts**

Map

Veveří

KOUNICOVA

KOLIŠTĚ

•2

5 min

•3

ÚDOLNÍ

ÚVOZ

DÉHO

12 min

Hotel
International

•1

ÚVOZ

PEKAŘSKÁ

HUSOVA

Brr

14 min

•4

VÁCLAVSKÁ

HYBEŠOVA

ÚZKÁ

ŘÍŽOVA

Workshops Reception Venue

1
Museum of Applied Arts Husova 14

The Workshops welcome reception will be held in the **Museum of Applied Arts**, just next to the conference hotel. At the beginning of the reception, you have the chance to attend the 28th International Biennial of Graphic Design Brno 2018.

Pre-EuroVis 2019 Party Venue & Light Fountain

2
Boulevard Restaurant Lidická 12

3
Light Fountain Rooseveltova 7

The pre-EuroVis 2019 party will be held in the **Boulevard Restaurant**. The walking time from the venue to the restaurant is about 12 minutes.
At 21.30, there will be **light show at the Light Fountain** in front of Janáček Theater, which is about 5 minute walk from the restaurant. After the show, the party will continue at the Boulevard Restaurant.

Conference Dinner Venue

4
Mendel Museum Mendlovo náměstí 1a

The **conference dinner** will be held in the **Augustinian Abbey** and **Mendel Museum**.

·············· **walking**

Sessions: Tuesday

Hall A

08.00 — **09.00**	**Registration**
09.00 — **09.40**	**EuroVis Opening Session** **Chair: B. Kozlíková**

Keynote: Drew Berry
Chair: A. Ynnerman
Title: Your respiration engines: real-time visualisations of dynamic molecular landscapes

09.40
—
11.20

Abstract: After 20 years of generating animations with slow, expensive rendering pipelines for movie production, WEHI.TV has switched to the extraordinary power of GPU hardware and accelerated game engines for generating vast, detailed molecular and membrane landscapes inside our living cells. Drew Berry will present the latest experiments producing cinematic movie sequences and real-time interactive '3D diorama' open-world scenes of mitochondria membranes and molecular engines that underlie the conversion of the food we eat into chemical energy for our cells. From 2017 WEHI.TV adopted and expanded upon the cellVIEW system to create a custom Maya to Unity pipeline that efficiently delivers real-time, multi-scale animated molecular worlds, to create interactive storytelling and meaningful experiences.

11.20 — **11.30**	**Short Break**
11.30 — **12.50**	**Fast Forwards** **Chairs: M. Waldner, D. Kouřil**
12.50 — **14.20**	**Lunch Break**

Technical Sessions
Full Papers I: Multiple Fields and Time
Chair: R. S. Laramee

Hall A

Hierarchical Correlation Clustering in Multiple 2D Scalar Fields
T. Liebmann, G. H. Weber, G. Scheuermann

Representative Consensus from Limited-Size Ensembles
M. Mirzargar, R. Whitaker

Time Lattice: A Data Structure for the Interactive Visual Analysis of Large Time Series
F. Miranda, M. Lage, H. Doraiswamy, C. Mydlarz, J. Salamon, Y. Lockerman, J. Freire, C. Silva

14.20 — 16.00

Key Time Steps Selection for Large-Scale Time-Varying Volume Datasets Using an Information-Theoretic Storyboard
B. Zhou, Y.-J. Chiang

Full Papers II: Comparative and Collaborative
Chair: M. Sedlmair

Hall D

ChangeCatcher: Increasing Inter-author Awareness for Visualization Development
M. H. Loorak, M. Tory, S. Carpendale

Towards Easy Comparison of Local Businesses Using Online Reviews
Y. Wang, H. Haleem, C. Shi, Y. Wu, X. Zhao, S. Fu, H. Qu

Chart Constellations: Effective Chart Summarization for Collaborative and Multi-User Analyses
S. Xu, C. Bryan, K. Li, J. Zhao, K.-L. Ma

Visualizing Expanded Query Results
M. Mazurek, M. Waldner

16.00 — 16.30	Coffee Break

Technical Sessions
Full Papers III: High-dimensional Data
Chair: C. Turkay

Hall A

Interactive Visual Exploration of Local Patterns in Large Scatterplot Spaces
M. Chegini, L. Shao, R. Gregor, D. J. Lehmann, K. Andrews, T. Schreck

Fast and accurate CNN-based brushing in scatterplots
C. Fan, H. Hauser

Towards User-Centered Active Learning Algorithms
J. Bernard, M. Zeppelzauer, M. Lehmann, M. Müller, M. Sedlmair

16.30 — 18.10

Short Papers I: Flow, Volume, and Regions
Chair: C. Garth

Hall D

Perception-Aware Uncertainty Glyphs in the 3D Vector Fields
J.-Y. Lee, J. Park

Evolutionary Lines for Flow Visualization
W. Engelke, I. Hotz

Pressure-based vortex extraction in cardiac 4D PC-MRI blood flow data
B. Köhler, M. Grothoff, M. Gutberlet, B. Preim

Colored Stochastic Shadow Mapping for Direct Volume Rendering
J. Weidner, L. Linsen

Visualizing Functional Regions by Analysis of Geo-textual Data
Y. Wang, G. Baciu, C. Li

STAR Papers I: Human Factors and Evaluation
Chair: D. Archambault

Rooms 3+4

16.30 – 18.10

Information Visualization Evaluation Using Crowdsourcing
R. Borgo, L. Micallef, B. Bach, F. McGee, B. Lee

Human Factors in Streaming Data Analysis: Challenges and Opportunities for Information Visualization (CGF)
A. Dasgupta, D. L. Arendt, L. R. Franklin, P. C. Wong, K. A. Cook

19.00   **Welcome Reception and Poster Session**

Halls B+C
Hotel International

Sessions: Wednesday

08.00 — 09.00	Registration

Technical Sessions
Full Papers IV: Visualization Design
Chair: R. Borgo

Hall A

Exploring the Visualization Design Space with Repertory Grids
K. Kurzhals, D. Weiskopf

Design Factors for Summary Visualization in Visual Analytics
A. Sarikaya, M. Gleicher, D. A. Szafir

Assessing Effects of Task and Data Distribution on the Effectiveness of Visual Encodings
Y. Kim, J. Heer

The Perception of Graph Properties in Graph Layouts
U. Soni, Y. Lu, B. Hansen, H. Purchase, S. Kobourov, R. Maciejewski

09.00 — 10.40

Full Papers V: Medical Visualization
Chair: K. Lawonn

Hall D

Explorative Blood Flow Visualization using Dynamic Line Filtering based on Surface Features
B. Behrendt, P. Berg, O. Beuing, B. Preim, S. Saalfeld

Visual and quantitative analysis of great arteries' blood flow jets in cardiac 4D PC-MRI data
B. Köhler, M. Grothoff, M. Gutberlet, B. Preim

Bladder Runner: Visual Analytics for the Exploration of RT-Induced Bladder Toxicity in a Cohort Study
R. G. Raidou, O. Casares-Magaz, A. Amirkhanov, V. Moiseenko, L. P. Muren, J. Einck, A. Vilanova, E. Gröller

Feature of Interest based Direct Volume Rendering Using Contextual Saliency-driven Ray Profile Analysis (CGF)
Y. Jung, J. Kim, A. Kumar, D. D. Feng, M. Fulham

10.40 – 11.10	Coffee Break

**Technical Sessions
Full Papers VI: Structure and Shape
Chair: L. Linsen**

ConcaveCubes: Supporting Cluster-based Geographical Visualization in Large Data Scale
M. Li, F. Choudhury, Z. Bao, H. Samet, T. Sellis

Hypersliceplorer: Interactive visualization of shapes in multiple dimensions
T. Torsney-Weir, T. Moeller, M. Sedlmair, M. Kirby

Exploring High-Dimensional Structure via Axis-Aligned Decomposition of Linear Projections
J. J. Thiagarajan, S. Liu, K. N. Ramamurthy, P.-T. Bremer

On-The-Fly Tracking of Flame Surfaces for the Visual Analysis of Combustion Processes (CGF)
T. Oster, A. Abdelsamie, M. Motejat, T. Gerrits, C. Rössl, D. Thévenin, H. Theisel

11.10 – 12.50

**Short Papers II: Visual Analytics and Applications
Chair: J. Kohlhammer**

Visual Analysis of Parallel Interval Events
J. Qi, C. Liu, B. C. M. Cappers, H. van de Wetering

Comparative Visual Analysis of Pelvic Organ Segmentations
O. Reiter, M. Breeuwer, E. Gröller, R. G. Raidou

Improving Provenance Data Interaction for Visual Storytelling in Medical Imaging Data Exploration
L. Amabili, J. Kosinka, L. Yu, P. M. A. van Ooijen, M. van Meersbergen, P. Svetachov, J. Roerdink

ChemoExplorer: A Dashboard for the Visual Analysis of Chemotherapy Response in Breast Cancer Patients
N. Karall, E. Gröller, R. G. Raidou

TapVis: A Data Visualization Approach for Assessment of Alternating Tapping Performance in Patients with Parkinson's Disease
I. Jusufi, D. Nyholm, M. Memedi

STAR Papers II: FlowVis
Chair: D. Lehmann

11.10 — 12.50	**Generation and Visual Exploration of Medical Flow Data: Survey, Research Trends, and Future Challenges (CGF)** S. Oeltze-Jafra, M. Meuschke, M. Neugebauer, S. Saalfeld, K. Lawonn, G. Janiga, H.-C. Hege, S. Zachow, B. Preim
	The State of the Art in Vortex Extraction (CGF) T. Guenther, H. Theisel

12.50 — 14.20	**Lunch Break**

Technical Sessions
Full Papers VII: Embeddings
Chair: J. Bernard

Hall A

The LloydRelaxer — An Approach to Minimize Scaling Effects for Multivariate Projections (TVCG)
D. J. Lehmann, H. Theisel

Interactive Analysis of Word Vector Embeddings
F. Heimerl, M. Gleicher

PixelSNE: Pixel-Aligned Stochastic Neighbor Embedding for Efficient 2D Visualization with Screen-Resolution Precision
M. Kim, M. Choi, S. Lee, J. Tang, H. Park, J. Choo

Visualizing Multidimensional Data with Order Statistics
M. Raj, R. Whitaker

**14.20
—
16.00**

Full Papers VIII: Vector and Tensor Fields
Chair: C. Garth

Hall D

Visualizing the Phase Space of Heterogeneous Inertial Particles in 2D Flows
I. B. Rojo, M. Gross, T. Günther

Visualization of 4D Vector Field Topology
L. Hofmann, B. Rieck, F. Sadlo

An Approximate Parallel Vectors Operator for Multiple Vector Fields
T. Gerrits, C. Roessl, H. Theisel

Core Lines in 3D Second-Order Tensor Fields
T. Oster, C. Roessl, H. Theisel

**16.00
—
16.30**   **Coffee Break**

Technical Sessions
Full Papers IX: Visual Analytics
Chair: T. von Landesberger

Hall A

Track Xplorer: A System for Visual Analysis of Sensor-based Motor Activity Predictions
M. Cavallo, Ç. Demiralp

ThreadReconstructor: Modeling Reply-Chains to Untangle Conversational Text through Visual Analytics
M. El-Assady, R. Sevastjanova, D. Keim, C. Collins

Viewing Visual Analytics as Model Building (CGF)
N. Andrienko, T. Lammarsch, G. Andrienko, G. Fuchs, D. Keim, S. Miksch, A. Rind

16.30 — 18.10

Short Papers III: Design and Evaluation
Chair: M. Sedlmair

Hall D

VisGuides: A Forum for Discussing Visualization Guidelines
A. Diehl, A. Abdul-Rahman, M. El-Assady, B. Bach, D. Keim, M. Chen

Sketching Temporal Uncertainty — An Exploratory User Study
F. Schwarzinger, A. Roschal, T. Gschwandtner

Issues and Suggestions for the Development of a Biodiversity Data Visualization Support Tool
P. Kaur, F. Klan, B. König-Ries

Using a task classification in the visualisation design process for task understanding and abstraction: an empirical study
N. Kerracher, J. B. Kennedy, K. Chalmers

STEIN: speeding up evaluation activities with a Seamless Testing Environment INtegrator
M. Angelini, G. Blasilli, S. Lenti, G. Santucci

STAR Papers III: Visualizing 3D Objects
Chair: C. Turkay

Rooms 3+4

16.30
—
18.10

A Survey of Flattening-Based Medical Visualization Techniques
J. Kreiser, M. Meuschke, G. Mistelbauer, B. Preim, T. Ropinski

Geometric Detection Algorithms for Cavities on Protein Surfaces in Molecular Graphics: A Survey (CGF)
T. Simões, D. Lopes, S. Dias, F. Fernandes, J. Pereira, J. Jorge, C. Bajaj, A. Gomes

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20:00   **EuroVis 2019 Invitation Party**   **Boulevard Restaurant**

21:30   **Light Show at Light Fountain**   **Light Fountain in front of the Janáček Theater**

22:00   **EuroVis 2019 Invitation Party**   **Boulevard Restaurant**

Sessions: Thursday Halls A, D

08.00 — 09.00	**Registration**

Technical Sessions
Full Papers X: Biological Visualization
Chair: S. Bruckner

Hall A

A General Illumination Model for Molecular Visualization
P. H. Casajus, P.-P. Vázquez, À. Vinacua, T. Ropinski

Analyzing Residue Surface Proximity to Interpret Molecular Dynamics
N. Lichtenberg, R. Menges, V. Ageev, A. A. P. George, P. Heimer, D. Imhof, K. Lawonn

Visual Analysis of Protein-ligand Interactions
P.-P. Vázquez, P. H. Casajus, V. Guallar, J. Estrada, À. Vinacua

DimSUM: Dimension and Scale Unifying Maps for Visual Abstraction of DNA Origami Structures
H. Miao, E. De Llano, T. Isenberg, E. Gröller, I. Barišić, I. Viola

09.00 — 10.40

Full Papers XI: VR and Workflows
Chair: B. Hentschel

Hall D

VirtualDesk: A Comfortable and Efficient Immersive Information Visualization Approach
J. A. Wagner Filho, C. M. D. S. Freitas, L. Nedel

Maps and Globes in Virtual Reality
Y. Yang, B. Jenny, T. Dwyer, K. Marriott, H. Chen, M. Cordeil

Landscaper: A Modeling System for 3D Printing Scale Models of Landscapes
K. Allahverdi, H. Djavaherpour, A. Mahdavi-Amiri, F. Samavati

CFGExplorer: Designing a Visual Control Flow Analytics System around Basic Program Analysis Operations
S. Devkota, K. Isaacs

10.40 – 11.10	**Coffee Break**

Technical Sessions
Full Papers XII: Applications
Chair: J. Schmidt

Illustrative Multivariate Visualization for Geological Modelling
A. Rocha, R. C. R. Mota, H. Hamdi, U. Alim, M. C. Sousa

Hunting High and Low: Visualising Shifting Correlations in Financial Markets
P. Simon, C. Turkay

Baseball Timeline: Summarizing Baseball Plays Into a Static Visualization
J. H. P. Ono, C. Dietrich, C. Silva

Short Papers IV: Information Visualization and Visual Analytics
Chair: A. Kerren

11.10 – 13.10

Exploring Interactive Linking Between Text and Visualization
S. Latif, D. Liu, F. Beck

Learning from the Best – Visual Analysis of Quasi-Optimal Data Labeling Strategies
J. Bernard, M. Hutter, M. Lehmann, M. Müller, M. Zeppelzauer, M. Sedlmair

Pixel Wise Pie Charts: Placement of Data Points Visualizing Spatial Value Distributions
H. Janetzko, M. Stein

DiffPin: Interactive Specification of References for Comparative Small-Multiple Displays
F. Spechtenhauser, H. Piringer

Touch the Time: Touch-Centered Paradigms for Time-Oriented Data
P. Riehmann, J. Reibert, J. Opolka, B. Froehlich

Risk fixers and sweet spotters: A study of the different approaches to using visual sensitivity analysis in an investment scenario
T. Torsney-Weir, S. Afroozeh, M. Sedlmair, T. Moeller

35

STAR Papers IV: Dealing with Scale
Chair:

11.10
—
13.10

Quality Metrics for Information Visualization
M. Behrisch, M. Blumenschein, N. W. Kim, L. Shao, M. El-Assady, J. Fuchs, D. Seebacher, A. Diehl, U. Brandes, H. Pfister, T. Schreck, D. Weiskopf, D. A. Keim

Data Reduction Techniques for Simulation, Visualization, and Data Analysis (CGF)
S. Li, N. Marsaglia, C. Garth, J. Woodring, J. Clyne, H. Childs

13.10
—
14.20

Lunch Break

Technical Sessions
Full Papers XIII: Scalar Fields
Chair: T. Günther

Hall A

Cosine-Weighted B-Spline Interpolation on the Face-Centered Cubic Lattice
G. F. Rácz, B. Csébfalvi

Spatio-Temporal Contours from Deep Volume Raycasting
S. Frey

**14.20
—
16.00**

Rendering and Extracting Extremal Features in 3D Fields
G. L. Kindlmann, C. Chiw, T. Huynh, A. Gyulassy, J. Reppy, P.-T. Bremer

Pondering the Concept of Abstraction in (Illustrative) Visualization (TVCG)
I. Viola, T. Isenberg

STAR Papers V: Sports Visualization
Chair: R. Borgo

Hall D

State of the Art of Sports Data Visualization
C. Perin, R. Vuillemot, C. D. Stolper, J. T. Stasko, J. Wood,
S. Carpendale

**16.00
—
16.30**

Coffee Break

Sessions: Thursday Halls A, D

Technical Sessions
Full Papers XIV: Trees and Graphs
Chair: A. Kerren

Hall A

SetCoLa: High-Level Constraints for Graph Layout
J. Hoffswell, A. Borning, J. Heer

Multiscale Visualization and Exploration of Large Bipartite Graphs
N. Pezzotti, J.-D. Fekete, T. Höllt, B. P. F. Lelieveldt, E. Eisemann, A. Vilanova

16.30 — 18.10

Interactive Investigation of Traffic Congestion on Fat-Tree Networks Using TreeScope
H. Bhatia, N. Jain, A. Bhatele, Y. Livnat, J. Domke, V. Pascucci, T. Bremer

Industry Talks
Chair: R. Ošlejšek

Hall D

INTEL: Large Scale, State of the Art Visualization Using Intel's OSPRay and OpenSWR
Jim Jeffers — Senior Principal Engineer

20:00	**Conference Dinner**	**Augustinian Abbey and Mendel Museum**
22:00	**Surprise**	**Mendel Museum Courtyard**

Map

Mendel Museum

Hotel International

Tram 5, 6

Šilingrovo náměstí

ÚDOLNÍ

ÚVOZ

VÁCLAVSKÁ

——— transit 9 mins

·············· walking 15 mins

**09.00
—
09.30**

Registration

**09.30
—
11.10**

Capstone: Daniel Sýkora
Chair: I. Viola
Title: Artistic Style Transfer Demystified

Abstract: Example-based style transfer became recently popular thanks to significant advances made by neural-based approaches as well as guided patch-based synthesis. The hype around deep neural networks is so intense that it makes many people believe neural-based techniques will soon replace traditional patch-based methods. However, the situation is not as optimistic as it might look like on the first sight. In this talk, we analyze in detail pros and cons of both directions and reveal fundamental limitations which might not be directly apparent. Those will lead us to an observation that a promising avenue for further investigation lies in a careful combination of both approaches. We demonstrate first promising attempts in this new direction.

**11.10
—
12.00**

Awards and Closing Remarks
Chair: B. Kozlíková

Posters

CV3: Visual Exploration, Assessment, and Comparison of CVs
V. Filipov, P. Federico, S. Miksch

Extending Document Exploration with Image Retrieval: Concept and First Results
L. Shao, M. Glatz, E. Gergely, M. Müller, D. Munter, S. Papst, T. Schreck

Visually Exploring Data Provenance and Quality of Open Data
C. Bors, T. Gschwandtner, S. Miksch

Case Studies of Shareable Personal Map Visualization
P. Ruchikachorn

An Eye-Tracking Study on Sparklines within Textual Context
P. Ruchikachorn, P. Rattanawicha

Network Analysis for Financial Fraud Detection
R. Almeida Leite, T. Gschwandtner, S. Miksch, E. Gstrein, J. Kuntner

Validation of Quantitative Measures for Edge Bundling by Comparing with Human Feeling
R. Saga

ViMEC: Interactive Application for Micro-Cluster Visualizations
F. Schmidt, Y. Ehrenfeld

Exploring Uncertainty in Image Segmentation Ensembles
B. Fröhler, T. Möller, J. Weissenböck, H.-C. Hege, J. Kastner, C. Heinzl

Supporting Visual Parameter Analysis of Time Series Segmentation with Correlation Calculations
C. Eichner, H. Schumann, C. Tominski

The Impact of Visualizing Uncertainty on Train Trip Selection
M. Wunderlich, K. Ballweg, and T. von Landesberger

Categorizing Uncertainties in the Process of Segmenting and Labeling Time Series Data
M. Bögl, C. Bors, T. Gschwandtner, S. Miksch

Visual Analysis of Sentiment and Stance in Social Media Texts
K. Kucher, C. Paradis, A. Kerren

Towards Natural Language Empowered Interactive Data Analysis
C. Turkay, R. Henkin

A Visual Comparison of Hand-Drawn and Machine-Generated Human Metabolic Pathways
H.-Y. Wu, M. Nöllenburg, I. Viola

Notes

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