

39th German Conference on Pattern Recognition September 13-15, Basel, Switzerland



Conference Booklet

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Sponsors







University of Basel



Kanton Basel-Stadt

General Information

Travel to Basel

BY PLANE: Flights arrive at Basel (BSL) or Zurich (ZRH)

BY TRAIN: Basel can easily be reached by train. Please check the SBB website (<u>www.sbb.ch</u>) for timetables and additional information.

Transportation to the Congress Venue

The congress venue can easily be reached by public transport. For details please consult our map *Conference Venue* on page 15.

Mobility Ticket

Visitors staying at a hotel in Basel receive a Mobility Ticket when checking in. It enables guests to use public transport in the city of Basel and its surroundings free of charge (zones 10, 11, 13 and 15, including EuroAirport) for the duration of their stay. Some hotels issue a room reservation confirmation stamped with "Mobility Ticket." This entitles the visitor to free transfer from the airport to the hotel.

Taxi Services in Basel

All official taxis use a taxameter to calculate the price. A taxi from the train station to the conference site is about 20 CHF, from the airport about 40 CHF.

Taxi-Zentrale Basel:	+41 61 222 22 22
33er Taxi	+41 61 333 33 33
Taxiphon Genossenschaft	+41 61 444 44 44
Airport Taxi Service Basel:	+41 79 655 77 67

Registration

The registration will open on Tuesday and on Wednesday 08:00 AM to 12:30 PM. Please bring your ticket with the QR-Code to the registration desk in the entrance hall of the ZLF Building.

Conference Venue

If not specified otherwise, all events will take place at the University Hospital Basel, *Zentrum für Lehre und Forschung (ZLF)*, Hebelstrasse 20, 4031 Basel.

Welcome Reception

The welcome reception will be held on Tuesday at 18:00 in the Restaurant Centrino, next to the ZLF building. All conference and workshop/tutorials participants are cordially invited to join.

Conference Dinner on Thursday, September 14th

Location: Restaurant Safran Zunft, Gerbergasse 11, Basel.

Time: 18.00 h

How to get there: Please consult our map **Overview and Restaurants** on page **12ff**.



Connectivity during the event

Please connect to **USB_GUEST_WLAN** and enter your data to receive an SMS with your password. **eduroam** is available for registered users.

Proceedings

You will find the proceedings on a USB stick in your conference documentation. They will also be available at <u>https://gcpr2017.dmi.unibas.ch/</u>

Contact

Please do not hesitate to contact any of the following organizers if you have questions or require assistance:

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Emergency medical	144			
Organization Committee Chairs				
Prof. Thomas Vetter, University of Basel				

Prof. Volker Roth, University of Basel

Local Organization

Ruth Steinmann, University of Basel

PC Members

Andreas Dengel, Technical University of Kaiserslautern Andreas Geiger, Max Planck Institute for Intelligent Systems Andreas Maier, University of Erlangen-Nürnberg Andres Bruhn, University of Stuttgart Angela Yao, University of Bonn Arjan Kuijper, Frauenhofer IGD Bastian Leibe, RWTH Aachen University Bastian Goldlücke, University of Konstanz Bernhard Rinner, University of Klagenfurt Bernt Schiele, MPI for Informatics and Saarland University Björn Schuller, University of Passau Björn Menze, TU Munich Björn Ommer, University of Heidelberg Bodo Rosenhahn, University of Hannover Boris Flach, Technical University, Praque Carsten Rother, TU Dresden Carsten Steger MVTec Software GmbH Christian Theobalt, MPI for Informatics Saarbrücken Christian Riess, University of Erlangen-Nürnberg Christian Bauckhage, Fraunhofer IAIS Christian Heipke, LU Hannover Christoph Schnörr, University of Heidelberg Csaba Beleznai, AIT Daniel Cremers, TU Munich Daniel Scharstein, Middlebury College Dietrich Paulus, University of Koblenz-Landau Fred Hamprecht, University of Heidelberg Gerhard Rigoll, Technical University of Munich Gernot Fink, TU Dortmund Hanno Scharr, Jülich Research Centre Helmut Mayer, Bundeswehr University Munich Horst Bischof, Graz University of Technology Jan-Michael Frahm, University of North Carolina Joachim Buhmann, ETH Zürich Joachim Denzler, University of Jena

Joachim Weickert, Saarland University Josef Pauli, University of Duisburg-Essen Julia Vogt, University of Konstanz Jürgen Gall, University of Bonn Justus Piater, University of Innsbruck Karsten Borgwardt, ETH Zürich Klaus Tönnies, University of Magdeburg Konrad Schindler, ETH Zürich Laura Leal-Taixé, Technical University Munich Lorenzo Rosasco, University of Genova Marcello Pelillo, University of Venice Marco Loog, Delft University of Technology Margrit Gelautz, TU Vienna Mario Fritz, MPI for Informatics Martin Welk, UMIT Hall Matthias Hein, Saarland University Michael Goesele, TU Darmstadt Monika Sester, Uni Hannover Olaf Ronneberger, University of Freiburg Olaf Hellwich, TU Berlin Paolo Favaro, Universität Bern Peter Gehler, MPI Intelligent Systems Philipp Henniq, MPI Intelligent Systems Philippe Cattin, Uni Basel Rainer Stiefelhagen, Karlsruhe Institute of Technology Reinhard Klette, University of Auckland Reinhard Koch, Universität Kiel Rudolf Mester, University of Frankfurt Slobodan Iliic, TU Munich Stefan Roth, TU Darmstadt Stefan Steidl, University of Erlangen-Nürnberg Thomas Pock, Graz University of Technology Thomas Fuchs, MSKCC Thomas Brox, University of Freiburg Ullrich Köthe, University of Heidelberg Uwe Franke, Daimler AG Vaclav Hlavac, Czech Technical University Praque Walter Kropatsch, TU Wien Wilhelm Burger, FH Hagenberg Wolfang Förstner, Universität Bonn Xiaoyi Jiang, Münster University

Program

Keynotes

Prof. Dr. Kilian Q. Weinberger - Deep Learning with Dense Connectivity



Kilian Weinberger is an Associate Professor in the Department of Computer Science at Cornell University. He received his Ph.D. from the University of Pennsylvania in Machine Learning under the supervision of Lawrence Saul and his undergraduate degree in Mathematics and Computer Science from the University of Oxford. During his career, he has won several best paper awards at ICML (2004), CVPR (2004, 2017), AISTATS (2005) and KDD (2014, runner-up award). In 2011, he was

awarded the Outstanding AAAI Senior Program Chair Award and in 2012 he received an NSF CAREER award. He was elected co-Program Chair for ICML 2016 and for AAAI 2018. In 2016, he was the recipient of the Daniel M Lazar '29 Excellence in Teaching Award. Kilian Weinberger's research focuses on Machine Learning and its applications. In particular, he focuses on learning under resource constraints, metric learning, machine learned web-search ranking, computer vision and deep learning. Before joining Cornell University, he was an Associate Professor at Washington University in St. Louis and before that he worked as a research scientist at Yahoo! Research in Santa Clara.

Abstract

Although half a decade has passed since Frank Rosenblatt's original work on multi-layer perceptrons, modern artificial neural networks are still surprisingly similar to his original ideas. In this talk I will question one of their most fundamental design aspects. As networks have become much deeper than had been possible or had even been imagined in the 1950s, it is no longer clear that the layer by layer connectivity pattern is a well-suited architectural choice. In the first part of the talk I will show that randomly removing layers during training can speed up the training process, make it more robust, and ultimately lead to better generalization. We refer to this process as learning with stochastic depth as the effective depth of the networks varies for each minibatch. In the second part of the talk I will propose an alternative connectivity pattern, Dense Connectivity, which is inspired by the insights obtained from stochastic depth. Dense connectivity leads to substantial reductions in parameter sizes, faster convergence, and further improvement in generalization. Finally, I will investigate the question why deep neural networks are so well suited for natural images and provide evidence that they linearize the underlying sub-manifold into a Euclidean feature space.

Prof. Dr. Pietro Perona - Towards a computational approach to behavior



Professor Perona's research focusses on vision: how do we see and how can we build machines that see. Professor Perona has been mostly active in the area of visual recognition, more specifically visual categorization. He is studying how machines can learn to recognize frogs, cars, faces and trees with minimal human supervision, and how one could make large image collections and even the web searchable by image content.

Degrees and Appointments:

D.Eng., University of Padua (Italy), 1985; Ph.D., University of California, Berkeley, 1990. Assistant Professor, Caltech, 1991-96; Professor, 1996-2008; Puckett Professor, 2008-. Director, Center for Neuromorphic Systems Engineering, 1999-2004. Executive Officer, 2006-10

Abstract

To interact successfully with people machines will need a visual system that allows them to `read' behavior: who is where, what are they doing and why, what will happen next. I will describe our work towards a computational approach to the study of behavior, including our efforts in building automated systems to measure and analyze the trajectories, actions and activities of animal models such as fruit fly Drosophila and mouse, as well as humans. I will speculate on future directions including predicting future events and understanding causal relationships.

Prof. Dr. Marcello Pelillo - Through the Philosopher's Glass



Marcello Pelillo is Professor of Computer Science at Ca' Foscari University in Venice, Italy, where he directs the European Centre for Living Technology (ECLT) and the Computer Vision and Pattern Recognition group. He held visiting research positions at Yale University, McGill University, the University of Vienna, York University (UK), the University College London, the National ICT Australia (NICTA), and is an affiliated faculty member of Drexel University (USA).

He has published more than 200 technical papers in refereed journals, handbooks, and conference proceedings in the areas of pattern recognition, computer vision and machine learning. He is General Chair for ICCV 2017, Track Chair for ICPR 2018, and has served as Program Chair for several conferences and workshops, many of which he initiated (e.g., EMMCVPR, SIMBAD, IWCV). He serves (has served) on the Editorial Boards of the journals IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Pattern Recognition, IET Computer Vision, Frontiers in Computer Image Analysis, Brain Informatics, and serves on the Advisory Board of the International Journal of Machine Learning and Cybernetics. Prof. Pelillo has been elected a Fellow of the IEEE and a Fellow of the IAPR, and has recently been appointed IEEE SMC Distinguished Lecturer.

Abstract

Scientists have typically divergent attitudes towards philosophy, ranging from those who think that science without epistemology is "primitive and muddled" (Einstein) to those who claim we should not expect philosophy to provide them "with any useful guidance about how to go about their work" (Weinberg). Although both positions contain an element of truth, in this talk I'll side with the former, in the conviction that a greater awareness of the philosophical questions underpinning one's research field can only be beneficial and, in any case, can't do any harm. In particular, I'll take the view that machine learning and pattern recognition are "a continuation of epistemology by other means" (*), and will try to critically examine some of the most fundamental (and often tacit) assumptions of our field through a philosopher's lens. This could be an opportunity for reflection, reassessment and possibly some synthesis, with a view to provide the field a self-portrait of where it currently stands and where it is going as a whole.

[* Liberally adapted from Carl von Clausewitz.]

Workshop and Tutorials

Tuesday, Sep 12

09:00-17:30 Tutorials

Session 1: 09:00-12:30 Interpretable Machine Learning.

o9:00 -12:30 Wojciech Samek, Fraunhofer Institute for Telecommunications, Berlin and Klaus-R. Müller, TU Berlin, Germany.

Session 2: 14:00-17:30 Medical Image Analysis.

14:00-15:30 Thomas Fuchs, Memorial Sloan Kettering Cancer Center, New York.

16:00-17:30 Marcel Lüthi, University of Basel, Switzerland.

09:00-18:00 Workshop

<u>New Challenges in Neural Computation (NC²).</u> Workshop of the GI-Fachgruppe Neuronale Netze and the German Neural Networks Society.

Location: Bernoullianum, Hörsaal 223, Bernoullistrasse 30.

Coffee for workshop/tutorial participants will be served 10:30-11:00 and 15:30-16:00 in the entrance hall of the ZLF building.

18:00 Welcome Reception. Restaurant Centrino, next to the ZLF building.

Main Conference

Wednesday, Sep 13

09:00-09:25 Opening/Awards.

09:25-10:20 German Pattern Recognition Award.

10:20-10:45 Oral session 1.

Motion and Segmentation:

10:20 Scalable Full Flow with Learned Binary Descriptors. Gottfried Munda, Alexander Shekhovtsov, Patrick Knöbelreiter, Thomas Pock.

10:45-11:15 Coffee.

11:15-12:30 Oral session 2.

Machine Learning and Pattern Recognition:

11:15 End-to-End Learning of Video Super-Resolution with Motion Compensation. Osama Makansi, Eddy Ilg, Thomas Brox.

11:40 A Primal Dual Network for Low-Level Vision Problems. Christoph Vogel, Thomas Pock.

Biomedical Image Processing:

12:05 A Quantitative Assessment of Image Normalization for Classifying Histopathological Tissue of the Kidney. Michael Gadermayr, Sean Cooper, Barbara Klinkhammer, Peter Boor, Dorit Merhof.

12:30-14:00 Lunch break.

14:00-15:15 Oral session 3

Classification and Detection:

14:00 Deep Learning for Vanishing Point Detection Using an Inverse Gnomonic Projection. Florian Kluger, Hanno Ackermann, Michael Ying Yang, Bodo Rosenhahn.

14:25 Learning Dilation Factors for Semantic Segmentation of Street Scenes. Yang He, Margret Keuper, Bernt Schiele, Mario Fritz.

Image and Video Processing:

14:50 Recurrent Residual Learning for Action Recognition. Ahsan Iqbal, Alexander Richard, Hilde Kuehne, Juergen Gall.

15:15-15:45 Coffee.

15:45-17:30 Poster Session 1.

Thursday, Sep 14

09:00-09:55 Keynote: Kilian Q. Weinberger, Cornell University.

09:55-10:45 Oral session 4.

<u>Computational Photography:</u> 09:55 Robust Multi-Image HDR Reconstruction for the Modulo Camera. Florian Lang, Tobias Plötz, Stefan Roth.

10:20 Motion Deblurring in the Wild. Mehdi Noroozi, Paramanand Chandramouli, Paolo Favaro.

10:45-11:15 Coffee.

11:15-12:30 Oral session 5.

Reconstruction and Depth:

11:15 Multi-View Continuous Structured Light Scanning. Fabian Groh, Benjamin Resch, Hendrik P.A. Lensch.

11:40 Down to Earth: Using Semantics for Robust Hypothesis Selection for the Five-Point Algorithm. Andreas Kuhn, True Price, Jan-Michael Frahm, Helmut Mayer.

12:05 An Efficient Octree Design for Local Variational Range Image Fusion. Nico Marniok, Ole Johannsen, Bastian Goldluecke.

12:30-14:00 Lunch break.

14:00-14:55 Keynote: Marcello Pelillo, Ca' Foscari University of Venice.

14:55-15:30 Coffee.

15:30-17:10 Oral session 6.

Mathematical Foundations and Statistical Models:

15:30 Adaptive Regularization in Convex Composite Optimization for Variational Imaging Problems. Byung-Woo Hong, Ja-Keoung Koo, Hendrik Dirks, Martin Burger.

15:55 Variational Networks: Connecting Variational Methods and Deep Learning. Erich Kobler, Teresa Klatzer, Kerstin Hammernik, Thomas Pock.

16:20 Diverse M-Best Solutions by Dynamic Programming. Carsten Haubold, Virginie Uhlmann, Michael Unser, Fred A. Hamprecht.

16:45 Model Selection for Gaussian Process Regression. Nico S. Gorbach, Andrew An Bian, Benjamin Fischer, Stefan Bauer, Joachim M. Buhmann.

18:00 Conference Dinner: Restaurant Safran Zunft, Gerbergasse 11.

Friday, Sep 15

09:00-09:55 Keynote: Pietro Perona, California Institute of Technology.

09:55-10:25 Coffee.

10:25-12.00 Poster Session 2.

12:00-12:20 Awards and Closing.

Maps

Overview and Restaurants

Conference dinner

1	Restaurant Safran Zunft	Gerbergasse 11		
Europ	ean, Swiss, Traditional cuisine			
2 3 4 5 6 7 8	Mensa Universität Basel Restaurant zum Tell Restaurant zur Harmonie Restaurant Hasenburg Restaurant jakob "Der vierte König" Kohlmanns Restaurant Löwenzorn	Bernoullistrasse 14 Spalenvorstadt 38 Petersgraben 71 Schneidergasse 20 Blumenrain 20 Steinengraben 14 Gemsberg 2/4		
Italian cuisine				
9 10	Spiga Ristorante Ristorante Centro	Eisengasse 9 Streitgasse 20		
Spanis	sh cuisine			
11 12	Restaurant Tapas del Mar Spalenburg Restaurant Bodega España	Schnabelgasse 2 Heuberg 4		
Anatolian cuisine				
13	Restaurant Pinar	Herbergerstrasse 1		
Indian cuisine				
14 15	Indian Tandoori Palace Mandir	Petersgraben 21 Schützenmattstrasse 2		





Conference Venue

