

18th International Symposium on Visual Computing

October 16-18, 2023, Lake Tahoe, Nevada, USA



ISVC 2023

Contents

MONDAY, OCTOBER 16 th	3
TUESDAY, OCTOBER 17 th	5
WEDNESDAY, OCTOBER 18 th	7
Poster Session	9
Keynote Speakers	10
Steering Committee/Area Chairs	17
International Program Committee	18
Special Tracks	24
Tutorials	26

Registration Desk Hours: Sunday, October 15th, 2023 (4pm – 6pm)
Monday, October 16th – Wednesday, October 18th, 2023 (8am-5:30pm)



Monday, October 16th

8:50 – 9:00	Welcome – <u>George Bebis</u> , University of Nevada, Reno		
9:00–10:00	Keynote: <u>Han-Wei Shen</u> , Ohio State University, USA (Sand Harbor II) Chair: <u>George Bebis</u>		
	Parallel Sessions		
10:10-12:10	ST: Biomedical Image Analysis Techniques for Cancer Detection, Diagnosis and Management (Sand Harbor II) Chair: <u>Ahmad Tafti</u>		Visualization (Tahoe A&B) Chair: <u>Tommy Dang</u>
	10:10	Parvaneh Aliniya, Mircea Nicolescu, Monica Nicolescu and George Bebis. Hybrid Region and Pixel-Level Adaptive Loss for Mass Segmentation on Whole Mammography Images	Jiahang Huang, Andrew Ni, Jasmine Zhang, Hongyi Zhu and Hui Zhang. Visualizing Multimodal Time Series at Scale
	10:30	Dikshant Sagar, Mohammad Pourhomayoun and Navid Amini. Deep Learning Based GABA Edited-MRS Signal Reconstruction	Chenguang Xu, Sarah Brown, Christan Grant and Chris Weaver. Hybrid Tree Visualizations for Analysis of Gerrymandering
	10:50	Marc Berghouse, George Bebis and Alireza Tavakkoli. Investigating the Impact of Attention on Mammogram Classification	Zhiyuan Cheng, Zeyuan Li, Zhepeng Luo, Mayleen Liu, Jonathan D'Alonzo and Chaoli Wang. ArcheryVis: A Tool for Analyzing and Visualizing Archery Performance Data
11:10-11:30	Coffee Break		
	11:30	Bharath Srinivas Prabakaran, Erik Ostrowski and Muhammad Shafique. ReFit: A Framework for Refinement of Weakly Supervised Semantic Segmentation using Object Border Fitting for Medical Images	Tommy Dang, V.T. Ngan Nguyen, Jie Li, Alan Sill and Yong Chen. Spiro: Order-preserving Visualization in High Performance Computing Monitoring
	11:50	Santiago Vallejo Silva et al., A Data-centric Approach for Pectoral Muscle Deep Learning Segmentation Enhancements in Mammography Images	Tim Büchner, Sven Sickert, Gerd Fabian Volk, Orlando Guntinas-Lichius and Joachim Denzler. From Faces To Volumes - Measuring Volumetric Asymmetry in 3D Facial Palsy Scans
10:10-12:10	Video Analysis and Event Recognition (Sand Harbor I) Chair: <u>Mircea Nicolescu</u>		
	10:10	Thura Zaw, Jiaxin Zhou and Takashi Komuro. Comparison of Autoencoder Models for Unsupervised Representation Learning of Skeleton Sequences	
	10:30	Ryuhei Ando, Yasunori Babazaki and Katsuhiko Takahashi. Local and Global Context Reasoning for Spatio-Temporal Action Localization	
	10:50	Jobin Idiculla Wattasseril, Sumit Shekhar, Jürgen Döllner and Matthias Trapp. Zero-Shot Video Moment Retrieval using BLIP-based Models	
11:10-11:30	Coffee Break		
	11:30	Fabian Sturm, Rahul Sathiyababu, Harshitha Allipilli, Elke Hergenroether and Melanie Siegel. Self-Supervised Representation Learning for Fine Grained Human Hand Action Recognition in Industrial Assembly Lines	
	11:50		
12:10-1:30	Lunch Break		

1:30-2:30	Keynote: David Fleet, University of Toronto & Google DeepMind, Canada (Sand Harbor II) Chair: <u>Mircea Nicolescu</u>	
	Tutorials	
2:40-6:00	Tutorial 1 (Tahoe A&B)	Tutorial 2 (Sand Harbor I)
2:40-4:10	Ethics, Bias and Responsible AI: Challenges and Mitigation Strategies <u>Organizer:</u> Marina L. Gavrilova, Department of Computer Science, University of Calgary	Immersive ParaView: New immersive visualization capabilities <u>Organizers:</u> William Sherman, National Institute of Standards and Technology (NIST) Simon Su, National Institute of Standards and Technology (NIST)
4:10-4:30	<i>Coffee Break</i>	
4:30-6:00	Ethics, Bias and Responsible AI: Challenges and Mitigation Strategies (cont'd)	Immersive ParaView: New immersive visualization capabilities (cont'd)
2:40-7:00	Tutorial 3 (Sand Harbor II)	
2:40-4:10	Explainable Deep Few-shot Learning on the Cloud and its Application in Medical Imaging Informatics (cont'd) <u>Organizers:</u> Ahmad P. Tafti, Ph.D., University of Pittsburgh Soheyla Amirian, Ph.D., University of Georgia Arvind Rao, Ph.D., University of Michigan Iman Zadeh, Ph.D., Oracle Bryan Barker, Ph.D., Oracle Johannes Plate, MD, Ph.D., University of Pittsburgh Shandong Wu, Ph.D., University of Pittsburgh	
4:10-4:30	<i>Coffee Break</i>	
4:30-7:00	Explainable Deep Few-shot Learning on the Cloud and its Application in Medical Imaging Informatics (cont'd)	

Tuesday, October 17th

9:00-10:00	Keynote: <u>Daphna Weinshall</u> , Hebrew University of Jerusalem, Israel (Sand Harbor II) (Cancelled due to recent developments in Israel)		
	Parallel Sessions		
10:10-12:10	ST: Generalization in Visual Machine Learning (Sand Harbor II) Chair: <u>Mohamed Shehata</u>		Computer Graphics (Tahoe A&B) Chair: <u>Tim McGraw</u>
	10:10	Muhammad Shaheryar, Lamyamba Laishram, Jong Taek Lee and Soon Ki Jung. Latent Space Navigation for Face Privacy: A Case Study on the MNIST Dataset	Varun Ramakrishnan and Tim McGraw. Water Animation Using Coupled SPH and Wave Equation
	10:30	Islam Osman, Islam Adel and Mohamed Shehata. Domain Generalization for Foreground Segmentation Using Federated Learning	Laura Fink, Daniel Keitel, Marc Stamminger and Joachim Keinert. UniTorch - Integrating Neural Rendering into Unity
	10:50	Jacob Bond, Siddhartha Gupta and Thanura Elvitigala. Probabilistic Local Equivalence Certification for Robustness Evaluation (Recorded)	Guanzhou Ji, Azadeh Sawyer and Srinivasa Narasimhan. Virtual Home Staging: Inverse Rendering and Editing an Indoor Panorama under Natural Illumination
11:10-11:30	Coffee Break		
	11:30	Jean-Baptiste Weibel, Paolo Sebetto, Stefan Thalhammer and Markus Vincze. Challenges of Depth Estimation for Transparent Objects	Alexander Komar and Ursula Augsdörfer. SwarmCurves: Evolutionary Curve Reconstruction
	11:50	Shahzad Ali, Yu Rim Lee, Soo Young Park, Won Young Tak and Soon Ki Jung. Volumetric Body Composition through Cross-Domain Consistency Training for Unsupervised Domain Adaptation	
10:10-12:10	Medical Image Analysis (Sand Harbor I) Chair: <u>Wei Zeng</u>		
	10:10	Wei Zeng, Xuebin Chang, Liqun Yang, Muhammad Razib, Zhong-Lin Lv and Yi-Jun Yang. Brain Cortical Surface Registration with Anatomical Atlas Constraints	
	10:30	Ibsa Jalata and Ukash Nakarmi. When System Model meets Image Prior: An Unsupervised Deep Learning Architecture for Accelerated Magnetic Resonance Imaging	
	10:50	Sean Wu, Naoki Kaneko, Steve Mendoza, David Liebeskind and Fabien Scalzo. 3D Reconstruction from 2D Cerebral Angiograms as a Volumetric Denoising Problem	
11:10-11:30	Coffee Break		
	11:30	Jiadong Yu and Rahul Singh. An Integrated Shape-Texture Descriptor for Modeling Whole-Organism Phenotypes in Drug Screening	
	11:50	Alan Okinaka, Gulfam Saju and Yuchou Chang. Enhancing Image Reconstruction via Phase-Constrained Data in an Iterative Process	
12:10-1:30	Lunch Break		

1:30-2:30	Keynote: Kwang Moo Yi , University of British Columbia, Canada (Sand Harbor II) Chair: <u>Marina Gavrilova</u>		
	Parallel Sessions		
2:40-3:40	Biometrics (Sand Harbor II) Chair: <u>Marina Gavrilova</u>		ST: Autonomous Anomaly Detection in Images (Tahoe A&B) Chair: <u>George Bebis</u>
	2:40	Md Shopon and Marina L Gavrilova . I Got Your Emotion: Emotion Preserving Face De-identification Using Injection-based Generative Adversarial Networks	Radovan Fusek, Eduard Sojka, Jan Gaura and Jakub Halman . Driver Anomaly Detection Using Skeleton Images
	3:00	Nathan Thom, Andrew DeBolt and Emily Hand . DoppelVer: A Benchmark for Face Verification	Mohammad Baradaran and Robert Bergevin . Future Video Prediction from a Single Frame for Video Anomaly Detection (recorded)
	3:20	M Faisal Nurnoby and El-Sayed M. El-Alfy . Two-stage Face Detection and Anti-spoofing	Chenxing Wang and Alireza Tavakkoli . Latent Diffusion based Multi-class Anomaly Detection
3:40-4:00	Coffee Break		
2:40-3:40	ST: Artificial Intelligence in Aerial and Orbital Imagery (Sand Harbor I) Chair: <u>Ara Nefian</u>		
	2:40	Charalampos Zafeiropoulos et al . Investigating the impact of a low-rank tensor-based approach on deforestation imagery	
	3:00	Jatin Katyal and Charalambos Poullis . Strategic Incorporation of Synthetic Data for Performance Enhancement in Deep Learning A Case Study on Object Tracking Tasks (Recorded)	
	3:20	Abigail Rolan and Sandeep Singh . Autonomous Navigation Via A Cascading CNN Framework Leveraging Synthetic Terrain Images	
3:40-4:00	Coffee Break		
4:00-5:30	Poster Session (Sand Harbor II)		ST: Innovations in Computer Vision & Machine Learning for Critical & Civil Infrastructures (Tahoe A&B) Chair: <u>Nikolaos Doulamis</u>
	(see page 9)	4:00	Matthieu Pâques et al. . Pretext Tasks in Bridge Defect Segmentation within a ViT-Adapter Framework
		4:20	Iason Katsamenis et al . A Few-Shot Attention Recurrent Residual U-Net for Crack Segmentation
		4:40	Polyzois Soumplis, Panagiotis Kokkinos and Emmanouel Varvarigos . Efficient Resource Provisioning in Critical Infrastructures based on Multi-Agent Rollout enabled by Deep Q-Learning
		5:00	Shaif Chowdhury, Sadia Nasrin Tisha, Monica McGarrity and Greg Hamerly . Video-Based Recognition of Aquatic Invasive Species Larvae Using Attention-LSTM Transformer
6:30-9:30	Banquet Dinner (Sand Harbor III) Keynote: Jiebo Luo , Rochester University, USA (at 8pm) Chair: <u>George Bebis</u>		

Wednesday, October 18^h

9:00-10:00	Keynote: <u>Paul Kry</u>, McGill University, Canada (Sand Harbor II) Chair: <u>Simon Su</u>	
	Parallel Sessions	
10:10-12:10	ST: Data Gathering, Curation, and Generation for Computer Vision and Robotics in Precision Agriculture (Sand Harbor II) Chair: <u>Dimitris Zermas</u>	Virtual Reality (Tahoe A&B) Chair: <u>Ourania Spantidi</u>
	10:10 Piyush Pandey, Norman Best and Jacob Washburn. Synthetically labeled images for maize plant detection in UAS images	Adam Williams, Anil Ufuk Batmaz, Xiaoyan Zhou, Michel Pahud and Francisco Ortega. A Pilot Study Comparing User Interactions Between Augmented and Virtual Reality
	10:30 Dario Guevara, Amogh Joshi, Pranav Raja, Elisabeth Forrestel, Brian Bailey and Mason Earles. An open source simulation toolbox for annotation of images and point clouds in agricultural scenarios	Brendan Kelley, Anil Ufuk Batmaz, Michael Humphrey, Cyane Tornatzky, Rosa Martey and Francisco Ortega. Emergent Individual Factors for AR Education and Training
	10:50 Hanzhe Teng, Yipeng Wang, Xiaobao Song and Konstantinos Karydis. Multimodal Dataset for Localization, Mapping and Crop Monitoring in Citrus Tree Farms	Lazaros Rafail Kouzelis and Ourania Spantidi. Synthesizing Play-Ready VR Scenes with Natural Language Prompts through GPT API
11:10-11:30	<i>Coffee Break</i>	
	11:30 Aminul Huq, Dimitris Zermas and George Bebis. Identification of Abnormality in Maize Plants From UAV Images Using Deep Learning Approaches	
	11:50 Emília Nogueira et al. Deep Learning for Super Resolution of Sugarcane Crop Line Imagery from Unmanned Aerial Vehicles	
10:10-12:10	Segmentation (Sand Harbor I) Chair: <u>El-Sayed M. El-Alfy</u>	
	10:10 Erik Ostrowski and Muhammad Shafique. ISLE: A Framework for Image Level Semantic Segmentation Ensemble	
	10:30 Jerry Zhou, Jack Zhou, Bruce Gaynes, Jie Xu, Mengren Wu and Parisa Mirbod. Particulate Mapping Centerline Extraction (PMCE), a Novel Centerline Extraction Algorithm Based on Patterns in the Spatial Distribution of Aggregates	
	10:50 Kenzo Milleville, Krishna Kumar Thirukokaranam Chandrasekar, Nico Van de Weghe and Steven Verstockt. Evaluating Segmentation Approaches on Digitized Herbarium Specimens	
11:10-11:30	<i>Coffee Break</i>	
	11:30 Tobias Bolten, Regina Pohle-Fröhlich and Klaus D. Tönnies. Semantic Scene Filtering for Event Cameras in Long-Term Outdoor Monitoring Scenarios	
	11:50 Rohit Venkata Sai Dulam and Chandra Kambhamettu. SODAWideNet - Salient Object Detection with an Attention augmented Wide Encoder Decoder network without ImageNet pre-training	
12:10-1:30	<i>Lunch Break</i>	

1:30-2:30	Keynote: Laura Trutoiu, Magic Leap, USA (Sand Harbor II) Chair: <u>Emily Hand</u>		
	Parallel Sessions		
2:40-4:40	Applications (Sand Harbor II) Chair: <u>Radovan Fusek</u>		Object Detection and Recognition (Tahoe A&B) Chair: <u>Kostas Karydis</u>
	2:40	Zachary Mossing, Kevin Hong, Fabien Scalzo and Eun Sang Cha. Foil-Net: Deep Learning-Based Wave Classification for Hydrofoil Surfing	Rina Tagami, Hiroki Kobayashi, Shuichi Akizuki and Manabu Hashimoto. Reliable Matching by Combining Optimal Color and Intensity Information based on Relationships between Target and Surrounding Objects
	3:00	Roland Fischer, Janis Roßkamp, Thomas Hudcovic, Anton Schlegel and Gabriel Zachmann. Inpainting of Depth Images using Deep Neural Networks for Real-Time Applications	Reece Walsh and Mohamed Shehata. Regularized Meta-Training with Embedding Mixup for Improved Few-Shot Learning
	3:20	Tim Büchner, Sven Sickert, Roland Graßme, Christoph Anders, Orlando Guntinas-Lichius and Joachim Denzler. Using 2D and 3D Face Representations to Generate Comprehensive Facial Electromyography Intensity Maps	Bijan Shahbaz Nejad, Peter Roch, Marcus Handte and Pedro José Marrón. Visual Foreign Object Detection for Wireless Charging of Electric Vehicles
3:40-4:00	Coffee Break		
	4:00	Hanzhou Liu, Mi Lu, Bingham Li and Yucheng Wu. Real-world Image Deblurring via Unsupervised Domain Adaptation	Kemeng Zhao, Liangrui Peng, Ning Ding, Gang Yao, Pei Tang and Shengjin Wang. Deep Representation Learning for License Plate Recognition in Low Quality Video Images (recorded)
	4:20		Peter Roch, Bijan Shahbaz Nejad, Marcus Handte and Pedro José Marrón. Optimizing PnP-Algorithms for Limited Point Correspondences Using Spatial Constraints
2:40-4:40	Deep Learning (Sand Harbor I) Chair: <u>Emily Hand</u>		
	2:40	Alejandro Rico Espinosa, Declan McIntosh and Alexandra Branzan Albu. Unsupervised Deep-Learning Approach for Underwater Image Enhancement	
	3:00	Upendra Suddamalla, Meghana Basavaraj and Shenxin Xu. LaneNet++ : Uncertainty-aware Lane Detection for Autonomous Vehicle	
	3:20	Mihir Kulkarni and Kostas Alexis. Task-driven Compression for Collision Encoding based on Depth Images	
3:40-4:00	Coffee Break		
	4:00	Jens Bayer, Stefan Becker, David Muench and Michael Arens. Eigenpatches - Adversarial Patches from Principal Components	
	4:20	Huining Liang and Chandra Kambhamettu. Edge-guided Image Inpainting with Transformer	

Poster Session (Sand Harbor II)

Tuesday, October 17th (4:00-5:30)

Ickbum Kim and Sandeep Singh. Bayesian Fusion inspired 3D reconstruction via LiDAR-Stereo Camera Pair
Daniel Beer and Andrea Salgian. Marimba Mallet Placement Tracker
Mohammadreza Shakouri, Fatemeh Iranmanesh and Mahdi Eftekhari. DINO-CXR: A Self Supervised Method Based on Vision Transformer for Chest X-Ray Classification
Ethan Shafer, Jesse Wood, Sheyla Street, Enoch Crow and Calvin Lu. Social Bias and Image Tagging: Evaluation of progress in state-of-the-art models
Alessandro Russo, Francesco Manigrasso, Fabrizio Lamberti and Lia Morra. L-TReiD: Logic Tensor Transformer for Re-Identification
Stewart Muchuchuti and Serestina Viriri. Retinal Disease Diagnosis with a Hybrid ResNet50-LSTM Deep Learning Model
Ethan Welborn and Sotirios Diamantas. Pothole Segmentation and Area Estimation with Deep Neural Networks and Unmanned Aerial Vehicles
Takahiro Suzuki and Manabu Hashimoto. Generation method of robot assembly motion considering physicality gap between humans and robots
Ala'A Alshubbak and Daniel Görges. A Self-Supervised Pose Estimation Approach for Construction Machines
Tomio Goto and Akira Kuchida. Image Quality Improvement of Surveillance Camera Images by Learning Noise Removal Method Using Noise2Noise
Alan Okinaka, Gulfam Saju and Yuchou Chang. Automating Kernel Size Selection in MRI Reconstruction via a Transparent and Interpretable Search Approach
Parminder Kaur, Daniela Gigante, Marco Caccianiga, Simonetta Bagella, Claudia Angiolini, Manolo Garabini, Franco Angelini and Paolo Remagnino. Segmentation and Identification of Mediterranean Plant Species
Gulfam Saju, Alan Okinaka and Yuchou Chang. Exploiting Generative Adversarial Networks in Joint Sensitivity Encoding for Enhanced MRI Reconstruction
Shamima Yasmin, Aina Chowdhury and Chowdhury Qaizar. Multisensory Modeling of Tabular Data for Enhanced Perception and Immersive User Experience
Lu-Hua Ma, En-Chen Chen and Tsai-Yen Li. Coping with Bullying Incidents by the Narrative and Multi-modal Interaction in Virtual Reality

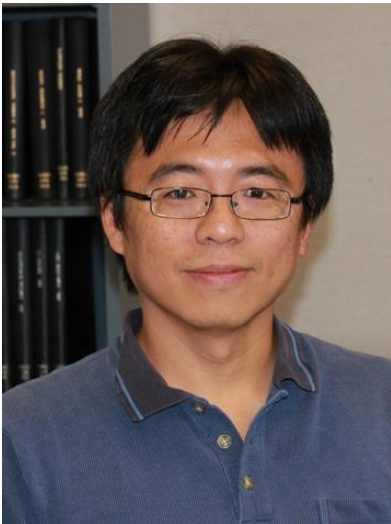
KEYNOTE TALK

Monday, October 16, 2023 at 9am

Machine Learning for Scientific Data Analysis and Visualization

Han-Wei Shan
The Ohio State University
USA

Abstract: In this talk, I will discuss our recent developments on using machine learning for scientific data analysis and visualization, with special focuses on visualization surrogates and compact representations for scientific data. I will first discuss how to construct visualization surrogates that can help streamline the visualization and analysis of large-scale ensemble simulations and facilitate the exploration of their immense input parameter space. Three different approaches for constructing such visualization surrogates: image space, object space, and hybrid image-object space approaches will be discussed. Then I will discuss how neural networks can be used to extract succinct representations from scientific data for rapid exploration and tracking of features. The use of geometric convolution to represent 3D particle data, and how regions of interest can be used as important measures for more efficient latent generation will be discussed.



Speaker Bio-Sketch: Han-Wei Shen is a Full Professor at The Ohio State University, and currently serves as the Editor-in-Chief of IEEE Transactions on Visualization and Computer Graphics. He is a member of IEEE VGTC Visualization Academy, and was the chair of the steering committee for IEEE SciVis conference from 2018-2020. His primary research interests are visualization, artificial intelligence, high performance computing, and computer graphics. Professor Shen is a winner of National Science Foundation's CAREER award and US Department of Energy's Early Career Principal Investigator Award. He received his BS degree from Department of Computer Science and Information Engineering at National Taiwan University in 1988, the MS degree in computer science from the State University of New York at Stony Brook in 1992, and the PhD degree in computer science from the University of Utah in 1998. From 1996 to 1999, he was a research scientist at NASA Ames Research Center in Mountain View California.

KEYNOTE TALK

Monday, October 16, 2023 at 1:30pm

Estimating the Structure and Motion of Biomolecules at Atomic Resolutions

David Fleet
University of Toronto & Google DeepMind
Canada

Abstract: One of the foremost problems in structural biology concerns the inference of the atomic-resolution 3D structure of biomolecules from electron cryo-microscopy (cryo-EM). The problem, in a nutshell, is a form of multi-view 3D reconstruction, inferring the 3D electron density of a particle from large sets of images from an electron microscope. I'll outline the nature of the problem and several of the key algorithmic developments, with particular emphasis on the challenging case in which the imaged molecule exhibits a wide range of conformational variation (or non-rigidity). Through single particle cryo-EM, methods from computer vision and machine learning are reshaping structural biology and drug discovery. This is joint work with Ali Punjani.



Speaker Bio-Sketch: David Fleet is a Research Scientist at Google DeepMind (since 2020) and a Professor of Computer Science at the University of Toronto (since 2004). From 2012-2017 he served as Chair of the Department of Computer and Mathematical Sciences, University of Toronto Scarborough. Before joining the University of Toronto, he worked at Xerox PARC (1999-2004) and Queen's University (1991-1998). He received the PhD in Computer Science from the University of Toronto in 1991. He was awarded an Alfred P. Sloan Research Fellowship in 1996 for his research on visual neuroscience. He received research paper awards at ICCV 1999, CVPR 2001, UIST 2003, BMVC 2009, and NeurIPS 2022. In 2010, with Michael Black and Hedvig Sidenbladh he received the Koenderink Prize for fundamental contributions to computer vision that withstood the test of time. In

2022, with Ali Punjani, he received the Paper of the Year Award from the Journal of Structural Biology for work on cryo-EM. He served as Associate Editor of IEEE Trans PAMI (2000-2004), as Program Co-Chair for CVPR (2003) and ECCV (2014), and as Associate Editor-In-Chief for IEEE Trans PAMI (2005-2008). He was Senior Fellow of the Canadian Institute of Advanced Research (2005-2019), and currently holds a Canadian CIFAR AI Chair. His current research interests span computer vision, image processing machine learning and computational biology.

KEYNOTE TALK

~~Tuesday, October 17, 2023 at 9am~~

(Cancelled due to recent developments in Israel)

Curriculum Learning and Active Learning, for Visual Object Recognition when Data is Scarce

Daphna Weinshall
Hebrew University of Jerusalem
Israel

Abstract: Deep learning protocols typically involve the random sampling of training examples by way of SGD. We investigated alternative paradigms, based on the empirical observation that the value of data points changes with time and network proficiency. In this talk I will start with curriculum learning, where by strategically arranging the learning data to present simpler concepts before more complex ones, networks can accelerate their understanding of the easier concepts, resulting in faster convergence and enhanced overall performance. I will then discuss active learning, where one deals with the annotation of data within a predetermined annotation budget. The objective is to select the data instances for annotation that will yield the greatest improvement for the learner. Surprisingly, our findings challenge traditional active learning strategies, which typically assume a high budget. We demonstrate that when the budget is low, it is more beneficial to prioritize annotating a small number of examples that represent the easiest and most typical instances within the data. This stands in contrast to the conventional approach, which suggests selecting examples from the hardest and most atypical portion of the data distribution.



Speaker Bio-Sketch: Daphna Weinshall is a professor of Computer Science at the Hebrew University of Jerusalem, Israel. She acted as a visiting professor at MIT and NYU, and a visiting researcher at IBM Research NY, NECI Research Lab NJ, and Philips Research NY. Dr Weinshall served as an area chair on the program committees of NeurIPS, CVPR, ICCV, ECCV and IJCAI, and on the editorial boards of IEEE PAMI, CVIU and MVA. Additionally, she served as a panel chair or panel member on a number of prestigious grant evaluation committees, including the advance ERC Grants evaluation panel in computer science. Her undergraduate degree in mathematics and computer science is from Tel Aviv University, and she received her M.S. and Ph.D. in statistics (population genetics) from Tel Aviv University. Her recent work is focused on developing and expanding methodologies for deep learning in dynamical settings, including pioneering work on curriculum learning and active learning.

KEYNOTE TALK

Tuesday, October 17, 2023 at 1:30pm

Have we solved image correspondences?

Kwang Moo Yi
University of British Columbia
Canada

Abstract: Finding correspondence across images is a fundamental task in computer vision, which recently, as in many areas of computer vision, have been revolutionized by deep learning. In this talk, I will talk about the state of research in finding correspondence across images, and whether this long-standing problem is actually solved. I will follow the historical trend in how the correspondence problem was tackled in our community, focusing on its application to camera pose estimation with sparse correspondences. Specifically, I will discuss how point cloud networks and deep networks with specific architectural considerations have played a key role in initial breakthroughs, and how they have now become “transformer-ized”. I will finally talk about the potential of using large-scale pre-trained models for the correspondence problem, and end with some thoughts on the future of correspondence research.



Speaker Bio-Sketch: Kwang Moo Yi is an assistant professor in the Department of Computer Science at the University of British Columbia (UBC), and a member of the Computer Vision Lab, CAIDA, and ICICS at UBC. Before, he was at the University of Victoria as an assistant professor. Prior to being a professor, he worked as a post-doctoral researcher at the Computer Vision Lab in École Polytechnique Fédérale de Lausanne (EPFL, Switzerland), working with Prof. Pascal Fua and Prof. Vincent Lepetit. He received his Ph.D. from Seoul National University under the supervision of Prof. Jin Young Choi. He also received his B.Sc. from the same University. He serves as area chair for top Computer Vision conferences (CVPR, ICCV, and ECCV), as well as Machine Learning (NeurIPS and AAAI). He is part of the organizing committee for CVPR 2023.

KEYNOTE TALK

Tuesday, October 17, 2023 at 8pm

Visual Content Manipulation by Learning Generative Models

Jiebo Luo
University of Rochester
USA

Abstract: Visual content manipulation involves modifying or re-synthesizing an input image such that the output follows a guidance input, such as a target layout, semantic clues, or new attributes. However, even with the development of deep generative models, visual content manipulation is challenging because it typically requires transferring visual patterns in a non-rigid fashion. Moreover, unsupervised learning schemes are often required to learn models without image-guidance data pairs. I will focus on how to: 1) design model architectures and mechanisms for visual pattern transfer, 2) design unsupervised learning schemes for learning from unpaired data, and 3) improve the fidelity of the generated content. Specifically, I will present research results on a range of manipulation tasks including pose-guided transfer, example-guided image synthesis, semantic local editing, image completion, and structure-guided inpainting.



Speaker Bio-Sketch: Jiebo Luo is the Albert Arendt Hopeman Professor of Engineering and Professor of Computer Science at the University of Rochester. His research focuses on computer vision, NLP, machine learning, data mining, social media, computational social science, and digital health. He has authored nearly 600 papers and over 90 U.S. patents. Prof. Luo is also an active member of the research community: a Fellow of NAI, ACM, AAAI, IEEE, IAPR, and SPIE, Editor-in-Chief of the IEEE Transactions on Multimedia (2020-2022), as well as a member of the editorial boards of the IEEE Transactions on Pattern Analysis and Machine Intelligence (2006-2011), IEEE Transactions on Multimedia (2004-2009, 2013-2016), IEEE Transactions on Circuits and Systems for Video Technology (2010-2012), IEEE Transactions on Big Data (2018-), Pattern Recognition (2002-2020), ACM Transactions on Intelligent Systems and Technology (2015-present), and so on. In addition, he served as an organizing or program committee member for numerous technical conferences sponsored by IEEE, ACM, AAAI, ACL, IAPR, and SPIE,

including most notably program co-chair of the 2010 ACM Multimedia Conference, 2012 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016 ACM Conference on Multimedia Retrieval (ICMR), and 2017 IEEE International Conference on Image Processing (ICIP).

KEYNOTE TALK

Wednesday, October 18, 2023 at 9am

Lights, Camera, Animation! Adaptive Simulation Methods for Training and Entertainment

Paul Kry
McGill University
Canada

Abstract: Physics-based simulations are a critical part of computer animation. This talk will provide a brief overview of new adaptive reduced methods that use rigid motion to speed up interactive and offline simulations of real-world phenomena. This includes merging rigid bodies at contacts, and rigidifying elastic bodies and shells when they are not deforming. The main challenge how to inexpensively identify when and where parts of a reduced system need more degrees of freedom. Applications and future directions will be discussed.



Speaker Bio-Sketch: Paul G. Kry received his B.Math. in computer science with electrical engineering electives in 1997 from the University of Waterloo, and his M.Sc. and Ph.D. in computer science from the University of British Columbia in 2000 and 2005. He spent time as a visitor at Rutgers during most of his Ph.D., and did postdoctoral work at INRIA Rhône Alpes and the LNRS at Université René Descartes. He is currently an associate professor at McGill University. His research interests are in physically based animation, including deformation, contact, motion editing, and simulated control of locomotion, grasping, and balance. He co-chaired ACM/EG Symposium on Computer Animation in 2012, Graphics Interface in 2014, and served on numerous program committees, including ACM SIGGRAPH, ACM/EG Symposium on Computer Animation, Pacific Graphics, and Graphics Interface. He is currently an associate editor for Computer Graphics Forum, and for Computers and Graphics. He heads the Computer Animation and Interaction Capture Laboratory at McGill University. Paul Kry is currently the president of the Canadian Human

Computer Communications Society, the organization which sponsors the annual Graphics Interface conference. Starting September 2016 Paul Kry served a 3-year term as a director at large on the ACM SIGGRAPH executive committee.

KEYNOTE TALK

Wednesday, October 18, 2023 at 1:30pm

Beyond the Specs: A Computational and Human-Centered Approach to Wearability in AR/VR

Laura Trutoiu
Meta Reality Labs
USA

Abstract: In the rapidly evolving landscape of AR/VR, 'wearability' emerges as a potentially critical aspect that can shape the future of this technology and ensure broad adoption. This talk introduces a framework for 'wearability' in AR/VR. We will go outside of the usual technical specifications like field of view or latency to consider elements of user experience, comfort, and aesthetics, all tied to human factors considerations. Furthermore, the talk will touch on how bringing a computational data-driven approach to human factors like simulation and modeling can speed up development and insights. Drawing from my industry experiences, I'll advocate for bringing more multidisciplinary expertise and collaboration to the development of next-generation wearable, AR/VR technology. Finally, I'd like the audience to consider what would it take to make AR/VR fully inclusive and wearable for everyone?



Speaker Bio-Sketch: Laura Trutoiu currently leads a multidisciplinary team at Meta's Reality Labs, using her background in computer graphics and robotics to tackle complex system issues. Her work focuses on bringing a computational lens to human factors and design of AR/VR headsets. Her team integrates data science, user research, hardware design, and modeling to optimize the form factor of wearables, and bridge the digital and physical worlds. Previously, Laura was a Senior Computer Scientist at Magic Leap's Advanced Technology office in Seattle, where she prototyped next generation wearable spatial computers. She earned her PhD from the Robotics Institute at Carnegie Mellon University, and her research spanned several industry labs including Disney Research, Industrial Light and Magic, and Max Planck Institute for Biological Cybernetics. In the early days of Oculus Research, she developed the first proof of concept for face-to-face communication in head-mounted displays with realistic facial animations for avatars.

Steering Committee

- Bebis George, University of Nevada, Reno (chair)
- Coquillart Sabine, INRIA
- Klosowski James, AT&T Labs Research
- Kuno Yoshinori, Saitama University
- Lin Steve, Microsoft
- Lindstrom Peter, Lawrence Livermore National Laboratory
- Moreland Kenneth, Oak Ridge National Laboratory
- Nefian Ara, NASA Ames Research Center
- Tafti Ahmad P., University of Pittsburgh

Area Chairs

Computer Vision

- Fang Yi, New York University
- Ghiasi, Golnaz, Google Brain

Computer Graphics

- Dong Yue, Microsoft
- Sharf Andrei, Ben-Gurion University

Virtual Reality

- Kohli Luv, InnerOptic Technology, Inc.
- LaViola Joseph, University of Central Florida

Visualization

- Liu Zhicheng (Leo), University of Maryland
- Weaver Chris, University of Oklahoma

Publicity Chair

- Ali Erol, Eksperta Software, Turkey

Tutorials & Special Tracks Chairs

- Hand Emily, University of Nevada, Reno
- Tavakkoli Alireza, University of Nevada, Reno

Awards Chairs

- Sun Zehang, Apple
- Amayeh Gholamreza, Aurora

Web Master

- Isayas Berhe Adhanom, University of Nevada, Reno

International Program Committee

Adamo-Villani	Nicoletta	Purdue University
Agu	Emmanuel	WPI
Ahmad	Touqeer	Blackmagic Design
Alexis	Kostas	Norwegian University of Science and Technology
Alim	Usman	University of Calgary
Ambardekar	Amol	Microsoft
Amirian	Sohelya	University of Georgia
Ammi	Mehdi	LIMSI-CNRS
Angara	Naga Surya Sandeep	National Institute of Health
Anvari	Zahra	University of Texas at Arlington
Apperley	Mark	University of Waikato
Argyros	Antonis	Foundation for Research and Technology – Hellas
Asari	Vijayan K	University of Dayton
Asesh	Aishwarya	Adobe
Athitsos	Vassilis	University of Texas at Arlington
Averkiou	Melinos	University of Cyprus
Baciu	George	The Hong Kong Polytechnic University
Bais	Abdul	University of Regina
Bakalos	Nikos	National Technical University of Athens
Balazs	Peter	University of Szeged
Balcisoy	Selim	Sabanci University
Barneva	Reneta	SUNY Fredonia
Barra	Paola	Università di Napoli Parthenope
Barzel	Ronen	independent
Batmaz	Anil Ufuk	Concordia University
Bender	Jan	RWTH Aachen University
Benes	Bedrich	Purdue University
Bhargava	Ayush	Facebook
Bhatia	Harsh	Lawrence Livermore National Laboratory
Bhatia	Sanjiv	University of Missouri, St. Louis
Biswas	Ayan	Los Alamos National Laboratory
Borges	Dibio	Universidade de Brasilia
Borland	David	The University of North Carolina at Chapel Hill
Bouguila	Nizar	Concordia University
Bouwman	Thierry	Univ. La Rochelle
Braz Pereira	Jose	EST Setúbal / IPS
Brimkov	Valentin	Buffalo State College
Broll	Wolfgang	Ilmenau University of Technology
Bruder	Gerd	University of Central Florida

Bryan	Chris	Arizona State University
Capin	Tolga	TED University
Chai	Sek	SRI International
Chang	Jian	Bournemouth University
Chatzis	Sotirios	Cyprus University of Technology
Chen	Cunjian	Michigan State University
Chen	Zhonggui	Xiamen University
Chiang	Yi-Jen	New York University
Cho	Isaac	Utah State University
Chourasia	Amit	University of California at San Diego
Dang	Tommy	Texas Tech University
Dasgupta	Aritra	NYU
Dequidt	Jeremie	University of Lille
Dhillon	Daljit Singh	Clemson University
Diamantas	Sotirios	Tarleton State University, Texas A&M System
Diehl	Alexandra	University of Konstanz
Dingliana	John	Trinity College Dublin
Doerner	Ralf	RheinMain University of Applied Sciences
Doretto	Gianfranco	West Virginia University
Doulamis	Anastasios	Technical University of Crete
Du	Shengzhi	Tshwane University of Technology
Dugar	Meenal	Penn State University
Dutta	Soumya	Los Alamos National Laboratory
Ebert	Achim	University of Kaiserslautern
Egbert	Parris	Brigham Young University
El Ansari	Mohamed	University of Ibn Zohr
El-Alfy	El-Sayed M.	King Fahd University of Petroleum and Minerals
Entezari	Alireza	University of Florida
Erol	Ali	Sigun Information Technologies
Eslami	Mohammad	University of Pittsburgh
Ferrara	Matteo	University of Bologna
Ferreira	Nivan	Universidade Federal de Pernambuco
Ferrise	Francesco	Politecnico di Milano
Fisher	Robert	The University of Edinburgh
Foresti	Gian Luca	University of Udine
Fudos	Ioannis	University of Ioannina
Fujishiro	Issei	Keio University
Fusek	Radovan	VŠB-Technical University of Ostrava
Gavrilova	Marina	University of Calgary
Gdawiec	Krzysztof	University of Silesia
Giorgi	Daniela	ISTI – CNR
Girish	Deeptha	University of Cincinnati
Goh	Wooi-Boon	Nanyang Technological University
Gong	Minglun	University of Guelph

Grisoni	Laurent	University of Lille
Gustafson	David	Kansas State University
Hamza-Lup	Felix	Georgia Southern University
Hand	Emily	University of Nevada, Reno
Haworth	Brandon	University of Victoria
Hazarika	Subhashis	Palo Alto Research Center
Hodgson	Eric	Miami University
Hua	Jing	Wayne State University
Hussain	Muhammad	King Saud University
Hussein	Ahmed	University of Guelph
Iwasaki	Kei	Saitama University
Jiang	Ming	LLNL
Jung	Sungchul	Kennesaw State University
Jung	Soon Ki	Kyungpook National University
Kam	Ho Chuen	The Chinese University of Hong Kong
Kanai	Takashi	The University of Tokyo
Karydis	Konstantinos	University of California, Riverside
Kenyon	Garrett	Los Alamos National Laboratory
Kim	Hyungseok	Konkuk University
Kim	Edward	Drexel University
Klosowski	James	AT&T Labs Research
Kollias	Stefanos	National Technical University of Athens
Komuro	Takashi	Saitama University
Kosmopoulos	Dimitrios	University of Patras
Krone	Michael	University of Tübingen
Kuijper	Arjan	TU Darmstadt
Kundu	Deepanjan	Meta Platforms
Kuno	Yoshinori	Saitama University
La	Hung	University of Nevada
Lai	Yu-Kun	Cardiff University
Laramée	Robert	Swansea University
Lewis	Robert R.	Washington State University
Li	Frederick	University of Durham
Li	Xin	Texas A & M University
Lien	Kuo-Chin	XMotors.ai
Lin	Chun-Cheng	National Yang Ming Chiao Tung University
Lin	Stephen	Microsoft
Lindstrom	Peter	LLNL
Liu	Hao	KLA Corporation
Liu	Shiguang	Tianjin University
Loaiza	Manuel	Universidad Católica San Pablo
Lohse	Ines	University of Pittsburgh
Loss	Leandro	QuantaVerse, ITU, ESSCA

Loviscach	Joern	Fachhochschule Bielefeld (University of Applied Sciences)
Lu	Aidong	UNC Charlotte
Macdonald	Brendan	NIOSH
Makrogiannis	Sokratis	Delaware State University
Mansoor	Hamid	University of Victoria
Martins	Rafael M.	Linnaeus University, Växjö
Masutani	Yoshitaka	Tohoku University
Mathews	Sherin	University of Delaware
Matkovic	Kresimir	VRVis Research Center
Mcgraw	Tim	Purdue University
Mestre	Daniel	Aix-Marseille University
Meunier	Jean	University of Montreal
Mistelbauer	Gabriel	Stanford University School of Medicine
Moreland	Kenneth	Oak Ridge National Laboratory
Morishima	Shigeo	Waseda University
Morris	Brendan	University of Nevada, Las Vegas
Moujahdi	Chouaib	Scientific Institute of Mohammed V University in Rabat
Mousas	Christos	Purdue University
Musse	Soraia	Pontificia Universidade Catolica do Rei Grande do Sul
Nazemi	Kawa	Darmstadt University of Applied Sciences
Nefian	Ara	NASA AMES/KBR
Nguyen	Quang Vinh	Western Sydney University
Nicolescu	Mircea	University of Nevada, Reno
Nikou	Christophoros	University of Ioannina, Ioannina
Noh	Junyong	Korea Advanced Institute of Science and Technology
Ntalianis	Klimis	University of West Attica
Nykl	Scott	Air Force Institute of Technology
Okada	Yoshihiro	Kyushu University
Olague	Gustavo	CICESE
Oshita	Masaki	Kyushu Institute of Technology
Paelke	Volker	Hochschule Bremen
Palagyi	Kalman	University of Szeged
Papachristos	Christos	University of Nevada, Reno
Papagiannakis	George	University of Crete
Papakostas	George	EMT Institute of Technology
Papka	Michael	Argonne National Laboratory and University of Illinois Chicago
Patanè	Giuseppe	CNR-IMATI
Patrignani	Maurizio	Roma Tre University
Payandeh	Shahram	Simon Fraser University
Pedrini	Helio	University of Campinas

Petrakis	Euripides	Technical University of Crete
Placidi	Giuseppe	University of L'Aquila
Ponto	Kevin	University of Wisconsin-Madison
Poovvancheri	Jiju	University of Victoria
Pronost	Nicolas	Université Claude Bernard Lyon 1
Qi	Lei	Iowa State University
Qin	Hong	Stony Brook University
Rasmussen	Christopher	University of Delaware
Regentova	Emma	University of Nevada, Las Vegas
Reina	Guido	University of Stuttgart
Reinhard	Erik	InterDigital
Rekabdar	Banafsheh	Portland State University
Ren	Hongliang	National University of Singapore
Rhyne	Theresa-Marie	Consultant
Ribeiro	Eraldo	Florida Institute of Technology
Rodgers	Peter	University of Kent
Roy	Sudipta	Jio Institute
Rudomin	Isaac	BSC
Sadlo	Filip	Heidelberg University
Saha	Punam	University of Iowa
Sakamoto	Naohisa	Kobe University
Sandberg	Kristian	Computational Solutions, Inc.
Sapidis	Nickolas S.	University of Western Macedonia
Scalzo	Fabien	Pepperdine University
Schultz	Thomas	University of Bonn
Séquin	Carlo H.	University of California, Berkeley
Sharma	Puneet	UiT-The Arctic University of Norway
Shead	Timothy	Sandia National Laboratories
Shehata	Mohamed	Memorial University
Singh	Vineeta	University of Cincinnati
Singh	Gurjot	Fairleigh Dickinson University
Skurikhin	Alexei	Los Alamos National Laboratory
Slavik	Pavel	Czech Technical University in Prague
Snoeyink	Jack	The University of North Carolina at Chapel Hill
Solari	Fabio	University of Genoa – DIBRIS
Spagnolo	Paolo	National Research Council
Sreevalsan-Nair	Jaya	IIIT Bangalore
Su	Chung-Yen	National Taiwan Normal University
Sun	Zehang	Apple inc.
Sun	Changming	CSIRO
Sun	Guodao	Zhejiang University of Technology
Tafti	Ahmad	University of Pittsburgh
Tapamo	Jules-Raymond	University of KwaZulu-Natal
Tavares	João Manuel R. S.	FEUP & INEGI

Teti	Michael	Los Alamos National Laboratory
Thalmann	Daniel	Ecole Polytechnique Fédérale de Lausanne
Theisel	Holger	Otto-von-Guericke University
Tian	Yuan	Innopeak Tech Inc
Tozal	Mehmet Engin	University of Louisiana at Lafayette
Tubaro	Stefano	Politecnico di Milano
Umlauf	Georg	University of Applied Science Constance
Viriri	Serestina	University of KwaZulu-Natal
Wang	Chaoli	University of Notre Dame
Wang	Cuilan	Georgia Gwinnett College
Watkins	Yijing	Pacific Northwest National Laboratory
Wong	Kin Hong	The Chinese University of Hong Kong
Wong	Tien-Tsin	The Chinese University of Hong Kong
Wu	Kui	LightSpeed Studios
Xu	Wei	Brookhaven National Lab
Yamamoto	Goshiro	Kyoto University
Yanagida	Yasuyuki	Meijo University
Yang	Xiaosong	Bournemouth University
Yen	Hsu-Chun	National Taiwan University
Yu	Zeyun	University of Wisconsin-Milwaukee
Yuan	Xiaoru	Peking University
Zabulis	Xenophon	FORTH
Zara	Jiri	Czech Technical University in Prague
Zeng	Wei	Xi'an Jiaotong University
Zermas	Dimitris	Sentera
Zhang	Jian	Bournemouth University
Zhao	Mengyang	Dartmouth College
Zheng	Jianmin	Nanyang Technological University
Zhu	Chenyang	Simon Fraser University
Zhu	Ying	Georgia State University

Special Tracks

Biomedical Image Analysis Techniques for Cancer Detection, Diagnosis and Management

Organizers:

George Bebis, University of Nevada, Reno, USA

Sokratis Makrogiannis, Delaware State University, USA

Hongfang Liu, University of Texas Health Science Center, Houston, TX, USA

Kurt R. Weiss, University of Pittsburgh, Pittsburgh, PA, USA

Ines Lohse, University of Pittsburgh, Pittsburgh, PA, USA

Ahmad P. Tafti, University of Pittsburgh, Pittsburgh, PA, USA

Generalization in Visual Machine Learning

Organizers:

Mohamed S. Shehata, University of British Columbia, BC, Canada

Minglun Gong, University of Guelph, Ontario, Canada

Thierry Bouwmans, La Rochelle Université, La Rochelle, France

Ahmed R. Hussein, University of Guelph, Ontario, Canada

Paola Barra, Università degli studi di Napoli « Parthenope », Italy

Deepak Kumar Jain, University of Chinese Academy of Sciences, China

Soon Ki Jung, Kyungpook National University, South Korea

Autonomous Anomaly Detection in Images

Organizers:

Aishwarya Alesh, Adobe, San Jose, USA

Meenal Dugar, Pennsylvania State University, University Park, USA

Data Gathering, Curation, and Generation for Computer Vision and Robotics in Precision Agriculture

Organizers:

Dimitris Zermas, Sentra, St Paul, Minnesota, USA

Konstantinos Karydis, University of California – Riverside, USA

Nikos Papanikolopoulos, University of Minnesota, USA

Kostas Alexis, Norwegian University of Science and Technology, Norway

George Bebis, University of Nevada – Reno, USA

Artificial Intelligence in Aerial and Orbital Imagery

Organizers:

Ara V. Nefian, KBR at NASA Ames Research Center, USA

Larry Edwards, NASA Ames Research Center, USA

Gary Bradski, OpenCV founder, USA

Mark Shirley, NASA Ames Research Center, USA

Innovations in Computer Vision & Machine Learning for Critical & Civil Infrastructures

Organizers:

Anastasios Doulamis, National Technical University of Athens, Greece

Nikolaos Bakalos, National Technical University of Athens, Greece

Hung (Jim) La, University of Nevada, Reno, USA

Tutorials

Explainable Deep Few-shot Learning on the Cloud and its Application in Medical Imaging Informatics

Organizers:

Ahmad P. Tafti, Ph.D., University of Pittsburgh, USA

Soheyla Amirian, Ph.D., University of Georgia, USA

Arvind Rao, Ph.D., University of Michigan, USA

Iman Zadeh, Ph.D., Oracle, USA

Bryan Barker, Ph.D., Oracle, USA

Johannes Plate, MD, Ph.D., University of Pittsburgh, USA

Shandong Wu, Ph.D., University of Pittsburgh, USA

Ethics, Bias and Responsible AI: Challenges and Mitigation Strategies

Organizers:

Marina L. Gavrilova, University of Calgary, Canada

Immersive ParaView: New immersive visualization capabilities

Organizers:

William Sherman, National Institute of Standards and Technology (NIST), USA

Simon Su, National Institute of Standards and Technology (NIST), USA