MODVIS 2023

VSS satellite workshop on Computational and Mathematical Models in Vision

May 18-19
Blue Heron room, Tradewinds Island Grand Resort
(upstairs from the main lobby - NOT the usual location!)

Overview

Thursday May 18

9:00-10:00: Session 1 - ***Objects and Shape***
10:00-10:30: Coffee break
10:30-11:50: Session 2 - ***Attention and Saliency***
11:50-12:00: Business meeting
12:00-2:00: Lunch on your own
2:00-3:20: Session 3 - ***Perceptual Space and Grouping***
3:20-4:00: Coffee break
4:00-5:20: Session 4 - ***Tools in Neuroscience***
5:20 – 5:40: Coffee Break
5:40 – 6:25: Keynote Lecture
6:25 – 6:40: Discussion

Friday May 19

9:00-10:00: Session 5 - ***Analytical Methods***
10:15-10:30: Coffee break
10:15-11:45: Session 6 - ***Symposium on Fixational Eye Movements***

Thursday 9:00 – 10:00: ***Objects and Shape***
Moderator: **Anne Sereno**

9:00 – 9:20: ***Efficient Coding of Local 2D Shape***
James Elder[1], Timothy D. Oleskiw[2,3], Ingo Fruend[4], Gerick M. Lee[2], Andrew Sutter[2,5], Anitha Pasupathy[6], Eero Simoncelli[2,3], J. Anthony Movshon[2], Lynne Kiorpes[2] and Najib Majaj[2].
[1] *York University*, [2] *New York University*, [3] *Flatiron Institute Center for Computational Neuroscience*; [4] *Verbally GmbH*; [5] *Drew University*; [6] *University of Washington*

9:20 – 9:40: ***Efficient Perception of Physical Object Properties With Visual Heuristics***
Vivian C. Paulun[1], Florian S. Bayer[2], Joshua B. Tenenbaum[1] *and* Roland W. Fleming[2].
[1] *Massachusetts Institute of Technology*; [2] *Justus Liebig University, Giessen*

9:40 – 10:00: ***Object Rigidity: Competition and Cooperation Between Motion-energy and Feature-Tracking Mechanisms and Shape-Based Priors***
Akihito Maruya and Qasim Zaidi, *Graduate Center for Vision Research*, *State University of New York*

10:00 – 10:30: Coffee Break

Thursday 10:30 - 11:50: ***Attention and Saliency***
Moderator: **Anne Sereno**

10:30 – 10:50: ***A Dynamical Model of Binding in Visual Cortex During Incremental Grouping and Search***
Daniel Schmid, Daniel A. Braun, and Heiko Neumann, *Institute for Neural Information Processing*, *Ulm University*

10:50 – 11:10: ***V1 Saliency Hypothesis and Central-Peripheral Dichotomy (CPD)***
Zhaoping Li, *Max Planck Institute for Biological Cybernetics*

11:10 – 11:30: ***Modeling the Spread of Object-Based Attention During Free Viewing***
Nicolas Roth[1], Olga Shurygina[2], Flora Marleen Muscinelli[1], Klaus Obermayer[1] and Martin Rolfs[2]. [1] *Technische Universität Berlin*; [2] *Humboldt-University Berlin*;

11:30 – 11:50: ***Evaluating Models of Scanpath Prediction***
Matthias Kümmerer and Matthias Bethge, *University of Tübingen*

11:50 - 12:00: Business meeting

12:00 – 2:00: Lunch break

Thursday 2:00 – 3:20: ***Perceptual Space and Grouping***
Moderator: **Qasim Zaidi**

2:00 – 2:20: ***From Image Gradients to a Perceptual Metric Space***
Alan Johnston, *University of Nottingham*

2:20 – 2:40: ***Constraining the Binding Problem Using Maps***
Zhixian Han and Anne Sereno, *Purdue University*

2:40 – 3:00: ***How Object Segmentation and Perceptual Grouping Emerge in Noisy Variational Autoencoders***
Ben Lonnqvist, Zhengqing Wu, and Michael H. Herzog, *Swiss Federal Institute of Technology, Lausanne*

3:00 – 3:20: ***A Model for Binocular Fusion***
Jian Ding, *University of California, Berkeley*

3:20 – 4:00: *Coffee Break*

Thursday 4:00 – 5:20: ***Tools in Neuroscience***
Moderator: **Qasim Zaidi**

4:00 – 4:20: ***Toward a Manifold Encoding Neural Responses***
Luciano Dyballa[1], Andra M. Rudzite[2], Mahmood S. Hoseini[3], Mishek Thapa[4], Michael P. Stryker[3], Greg D. Field[4] and Steven W. Zucker[1]. [1] *Yale University*; [2] *Duke University*; [3] *University of California, San Francisco*; [4] *University of California, Los Angeles*;

4:20 – 4:40: ***Comprehensive Analysis of the Retinal Cell Contributions to the Human ERG***
Christopher W. Tyler, *Smith-Kettlewell Eye Research Institute*

4:40 – 5:00: ***Automated Delineation of Visual Area Boundaries and Eccentricities by a CNN Using Functional, Anatomical, and Diffusion-Weighted MRI Data***
Noah C. Benson[1], Bogeng Song[2], Toshikazu Miyata[3], Hiromasa Takemura[3], and Jonathan Winawer[2]. [1] *University of Washington*; [2] *New York University*; [3] *Osaka University*;

5:00 – 5:20 ***The Model 2.0 and Friends: An Interim Report***
Garrison W. Cottrell, Martha Gahl, Shubham Kulkarni, Shashank Venkatramani, Yash Shah, Keyu Long, Xuzhe Zhi, Shivaank Agarwal, Cody Li, Jingyuan He, and Thomas Fischer. *University of California, San Diego*;

5:20 – 5:40: *Coffee Break*
5:40 – 6:25: *Keynote:* ***Neuro AI Modeling of Human Vision: How to Benchmark Understanding?***
Matthias Bethge, University of Tübingen
6:25 – 6:40: *Discussion (extended discussion possible to 7:00)*

Friday 9:00 – 10:00: ***Analytical Methods***
Moderator: **Marianne Maertens**

9:00 – 9:20: ***Modeling Pairwise Comparisons for Thurstonian Scaling and Kendall Rank Correlation***
Maarten Wijntjes, *Delft University of Technology*

9:20 – 9:40: ***A Signal Detection Model for the Analysis of Continuous Response Gradients and an Application to Confidence Rating Data***
Fabian A. Soto, *Florida International University*

9:40 – 10:00: ***Extracting Edges in Space and Time During Visual Fixations***
Lynn Schmittwilken, and Marianne Maertens, *Technische Universitat Berlin*

Friday 10:15 – 11:45: ***Symposium on Fixational Eye Movements***
Moderator: **Jeff Mulligan**

10:15 – 10:30: ***Active Encoding of Space Through Time***
Michele Rucci, *University of Rochester* and **Jonathan D. Victor**, *Weill Cornell Medical College*

10:30 – 10:45: ***Task-Driven Influences on Fixational Eye Movements***
Jonathan Victor[1], **Yen-Chu Lin**[1] and **Michele Rucci**[2]. [1] *Weill Cornell Medical College*; [2] *University of Rochester*

10:45 – 11:00: ***Are Microsaccades the Cause of Attention-Related Modulation in Visual Circuits?***
Richard Krauzlis[1], **Gongchen Yu**[1], **James Herman**[2] and **Leor Katz**[1]. [1] *National Eye Institute;* [2] *University of Pittsburgh*;

11:00 – 11:15: ***Physiological Rationale for Fixation Eye-Movements***
Qasim Zaidi[1]**,** Rob Ennis[1], Dingcai Cao[2], Barry Lee[1,3]. [1] *Graduate Center for Vision Research*, *State University of New York;* [2] *University of Illinois at Chicago;* [3] *Max Planck Institute*, *Gottingen;*

11:15 – 11:45: Panel Discussion

11:45: End of MODVIS 2023