

Pre-Data-Collection Poster Satellite Abstract Booklet (VSS 2026)

Saturday Afternoon

Banyan Breezeway, 2.45pm – 6.45pm

26.348. From Local Marks to Global Guidance: CAD Cueing in Pseudo-3D Contexts

Katharine E. Sabo, Dawn M. Sarno

University of Central Florida

Computer-aided detection (CAD) systems have been widely used for decades to assist with breast imaging assessments, evolving over time to provide both detection and diagnostic functions. Limited research has directly compared how different CAD implementations influence cancer detection and subsequent assessment, particularly with newer imaging techniques such as digital breast tomosynthesis (DBT). While both DBT and CAD can improve radiologist performance independently, they can also hinder performance, resulting in higher reading times or more false positives, respectively. Some early research suggests that combining these tools may mitigate their respective deficiencies. To investigate this potential interaction of automation and imaging technique, we will explore how different types of CAD systems influence cancer detection and categorization in simulated DBT. Participants will be asked to search for and identify synthetic masses embedded in mammographic texture slice stacks. Stimuli characteristics will be informed by the Breast Imaging Reporting and Database System (BI-RADS), with targets, distractors, and “tar-dis” differentiated by shape, margin, and density to represent malignant, benign, and ambiguous cases. Participants will use one of three CAD systems: analog (aCAD), circling regions of interest and providing localized, region-level probability-of-malignancy scores; BI-RADS (bCAD), providing global, trial-level BI-RADS ratings indicating mass presence and category; or hybrid (hCAD), combining aCAD and bCAD, providing both local and global guidance. This study will provide insights into how global/local guidance may affect detection and assessment performance in DBT image sets and how to best design CAD systems in these contexts.

26.349. Examining Different Types of Prohibited Items Within a Mock TSA Visual Search Task

Maria Levanidova, Dawn Sarno

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Transportation security administration (TSA) officers screen hundreds of bags each day to prevent prohibited items from boarding aircraft. With almost 500 categories of prohibited items, certain items (e.g. guns) may be more likely to be detected over others (e.g., toothpaste) due to factors such as the perceived threat of the item, or how representative that item is of a “prohibited” item. However, little research has explored how the nature of the prohibited item may influence search performance in the TSA context. In the present study, we will investigate whether participants are better at finding targets that have a higher inherent threat level (e.g., guns, snakes) or ones that are more representative of a prohibited item (e.g., guns, water bottles). Participants will be asked to identify if search arrays contain a prohibited item or not. Search displays will consist of everyday objects (e.g., teddy bears, socks, glasses) presented in circular arrays over an x-rayed bag. One prohibited item will be present on 50% of trials, and will be from one of four categories, (guns, water bottles, fireworks, and snakes) – each selected to represent all combinations of low and high inherent threat and representativeness of a prohibited item. We expect participants to find guns the fastest, due to both their high inherent threat and representativeness, and snakes/water bottles to be found faster than fireworks due to their higher threat and representativeness, respectively. The results of this study will improve our understanding of how certain aspects of prohibited items may influence their detection.

26.350. Spatial Suppression Under Simulated Central Vision Loss: Implications for Motion Processing in Macular Degeneration

Seonggyu Choe

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Spatial suppression — the paradoxical difficulty in discriminating the motion direction of large, high-contrast stimuli — reflects center-surround antagonism in MT/V5 that serves a crucial ecological function: suppressing background motion to enhance foreground object detection (Tadin et al., 2003; Tadin, 2015). Recent work on central field loss (CFL) from age-related macular degeneration (AMD) reveals a puzzling dissociation: basic motion perception (direction, speed) is largely preserved (Shanidze & Verghese, 2019), yet functional motion behaviors — smooth pursuit, motion extrapolation, and postural stability — are impaired (Shanidze et al., 2016; Rubinstein et al., 2025). Meanwhile, AMD patients show enhanced vection compared to controls, while glaucoma patients show reduced vection (Luu et al., 2021; Tarita-Nistor et al., 2008), suggesting that central versus peripheral field loss oppositely affects how the visual system weights large-field motion. We propose that spatial suppression is the mechanism linking these findings: CFL may degrade the “center” input to center-surround receptive fields, reducing surround suppression and thereby impairing foreground-background motion segregation. To test this, normally-sighted observers will discriminate the drift direction (up vs. down) of a high-contrast Gabor patch (spatial frequency: ~1 cpd; drift

speed: $\sim 4^\circ/\text{s}$) presented at fixation. Duration thresholds will be estimated using an adaptive staircase (3-down/1-up, targeting 79.4% correct) across multiple stimulus sizes (e.g., 0.7° , 1.8° , 5.0°). A fixed Gaussian low-pass spatial filter will be applied to the central region of the display, simulating degraded foveal input. Blur severity (cutoff frequency) and stimulus size will be parametrically varied.

26.351. The relative prioritization of stimulus-driven and goal-directed guidance in visual search

Kaitlyn N Drennan, Andrew Hollingworth

University of Iowa

Theories of attention make a classic distinction between stimulus-driven guidance (by physical salience) and goal-directed guidance (by a template representation of known target values). Research examining the interaction between these guidance types has typically evaluated attention capture by salient distractor stimuli (Theeuwes, 1992; Folk et al., 1992). This approach has limitations, since salient stimuli, rather than constituting a distraction, are often behaviorally relevant. Here we plan to test the systematic prioritization of salient signals and template-matching signals in guiding attention. Most researchers have assumed that visual salience guides attention rapidly, before template-based guidance can be implemented (e.g., Theeuwes, 1992; VanZoest et al., 2004). However, recent findings suggest that the time-courses of positive guidance from the two sources are largely overlapping (Niu et al., 2025). This suggests that participants, rather than being locked into a sequential guidance sequence (stimulus-driven then goal-driven), may be able to exert control over which type of guidance is implemented during the early stages of search. In an eye tracking paradigm, the target of search on each trial will either be a color singleton (salient target) or a shape that matches a cued value (template-matching target). Across blocks, we will manipulate the probability of each target type. The extremes (100% of either target type) allow assessment of the relative efficiency of each guidance type in isolation. Mixed-target blocks allow assessment of guidance-type prioritization based on the higher probability target type. Key measures will be target fixation probability and orienting time.

26.352. SMART-Tremor: A multimodal system for quantitative tremor and visuomotor assessment under induced tremor conditions

Marco Bragaglia, Francesco Edoardo Vaccari, Klara Hoxha, Stefano Diomedei, Patrizia Fattori, Annalisa Bosco

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Monday Morning

Banyan Breezeway, 8.30am – 12.30pm

43.348. Temporal Decoding of Reward Magnitude in Visual Decision-Making

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In visual decision-making, learning is informed by reward processing. The Reward Positivity (RewP) is a univariate neural signal generated by rewarding feedback, as measured by M/EEG. While the RewP is signal typically measured at frontal channels, we found evidence of a more widespread network of generators, including primary sensory regions. Specifically, we used Multivariate Pattern Analysis (MVPA) across sensors and source estimated vertices, which allows for sensitive classification of task features. We identified a multivariate signal which behaves similarly to the univariate RewP and allows decoding of reward versus non-reward. As a first step to understanding the representation of reward, the proposed study will investigate whether we can decode reward magnitude using MVPA in MEG since reward responses are known to scale monotonically with reward magnitude. Though the reward signal in our prior work was separated from sensory-specific features of reward, such as color or pitch, additional studies are needed to determine the extent to which other reward attributes are represented. Participants will complete a visual discrimination task in which feedback will be displayed as monetary reward. Rewarding feedback will vary in magnitude and will be probabilistically determined. Multiple representations of magnitude will also be used to prevent potential confounds of perceptual features. We plan to use both a sensor-and-source-space searchlight of the brain to determine the extent to which reward magnitude is represented across the brain.

43.349. Can virtual reality be used as a valid tool for studying human motor control?

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Virtual reality (VR) offers a unique opportunity to investigate how the brain integrates vision and action, as it allows the visual representation of the body to be manipulated in ways otherwise impossible in the real world. However, two key questions must be addressed before VR can be reliably used for this purpose. First, does vision of the hand improve motor performance, or is a simple cursor sufficient, as is often

assumed in motor control research? Second, are actions performed in VR hampered by the limitations of the technology, particularly by reduced accuracy of visual cues (vergence-accommodation conflict) and by challenges in rendering a realistic hand model with veridical limb mechanics. To address these questions, we will use a 2x2 design to examine the effects of environment (real world vs. VR) and hand representation (cursor vs. hand). Right-handed participants will perform reaches with a Kinarm robotic manipulandum while viewing a cursor or hand in a real-world set-up or through a VR headset calibrated to match the robot's physical workspace. Performance will be assessed using timing measures (reaction time, movement time) and accuracy measures (trajectory curvature, endpoint error). If viewing the hand improves performance relative to a cursor, this would suggest that body-related visual information contributes to more effective motor control. Reduced performance in VR would suggest that distortions introduced by the technology interfere with action accuracy. Further, an interaction between environment and hand representation would indicate that the benefits of seeing the hand depend on the accuracy of the hand model.

43.350. How unisensory localization biases (and their correction) shape audiovisual integration

Tianyu Zhang, Emily Cunningham, David Brang

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Sounds influence visual perception, enhancing the localization and detection of visual targets, particularly when they are spatially aligned. Yet achieving such multisensory enhancement is computationally challenging as the visual and auditory systems exhibit imperfectly aligned spatial receptive fields, with auditory RFs being larger and biased toward the periphery. Specifically, a recent large psychophysical study (N=384) reported a peripheral bias in the localization of auditory stimuli, but a central bias for visual stimuli, with substantial individual differences in the bias magnitude (Odegaard et al., 2015). To examine how the brain reconciles these modality-specific biases during audiovisual integration, we propose using a custom LED/speaker array with a two-stage design. First, participants perform unisensory localization tasks for visual (V) and auditory (A) stimuli to characterize individual localization biases across ~180° azimuth. Next, these individual bias profiles will be used to parameterize a detection task in the same participants, who will detect near-threshold visual targets with temporally concurrent sounds under three conditions: (i) spatially aligned A & V (matched physical locations), (ii) perceptually aligned A & V (physical locations offset to equate perceived location across modalities), and (iii) perceptually misaligned A & V (offsets doubled to enlarge perceived disparity across modalities). We hypothesize that (a) spatially aligned condition will replicate enhanced detection effects, (b) perceptually aligned condition will yield stronger enhancement, and (c) misalignment will abolish the effects. These findings will provide new insights into how spatial properties of different sensory systems scaffold (or constrain) audiovisual integration.

43.351. Does activity-silence recruit long-term memory? Using fMRI to decode unattended memory items

Michael KP Mugno, Timothy J Vickery

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Items held within working memory (WM), but not the current focus of attention in WM, have been observed to be “activity silent.” Such information shows few neural signatures of persistence. Although some behavioral evidence suggests that unattended memory items (UMIs), a term for items in activity silence, remain within the confines of working memory, some models contend that UMIs may be stored in a buffer state during a delay, and that this buffer state may lie within long-term memory (i.e., the activated long-term memory, or aLTM, of the embedded-processes model). In our proposed study, we intend to investigate whether UMIs are buffered in aLTM using fMRI. We will deploy three tasks over two days, comprising both independent WM and LTM tasks (day 1) and an independent double-retrocue paradigm (day 2). In the day 1 tasks, subjects will perform delayed match-to-sample tasks using face, scene, and tool stimuli to train tripartite classifiers on activation patterns unique to item maintenance in WM and item retrieval from LTM. In the double-retrocue task, subjects will hold two items simultaneously, with each item being probed successively. We intend to test the classifiers trained on the WM and LTM tasks, respectively, on the activation patterns of the second-retrocued item. If the LTM classifier out-performs the WM classifier, this supports the notion that items stored in activity-silence may be buffered in LTM. If WM classifiers prevail, this supports the notion of a true activity-silent state in WM, independent of LTM.

43.352. Neural correlates of radial-tangential anisotropy in numerosity perception

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