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Title: **You should never see an image: event-based vision from the maths up**
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Project name: HumAMI
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A conventional camera hands you a stack of pictures. An event camera does not. Each pixel fires on its own, asynchronously, at the moment the light it sees changes — a sparse stream of events in space and time, microseconds apart, with no frames, no exposure, no shutter. The tempting first move is to reconstruct frames from that stream and reach for the computer-vision toolbox we all know. It is also exactly the wrong move: it throws away what made the sensor interesting in the first place and hands back the latency, the motion blur and the data volume it was chosen to avoid.

At Sioux we have been building event-based systems across a range of applications, from the medical domain to several demanding use cases in semiconductor equipment. What we keep relearning is that it starts with the mathematics. The data lives in a space-time volume. Motion is geometry in that volume, not a difference between two pictures. Once the problem is described in those terms — surfaces of active events, trajectories, continuous-time estimation — the algorithms tend to get simpler rather than harder, and they inherit the sensor's microsecond resolution and dynamic range for free.

That insight then has to survive the trip to a working product. It takes electronic engineers, because the sparse, irregular, asynchronous nature of the data does not map onto standard vision pipelines and needs specialised compute. It takes system architects, because the sensor has to be integrated into something that ships. But it all starts with accepting the different nature of events: we never see images, we never should see images, we have to remain in a different space.

This talk covers what changes when you stop thinking in frames — the underlying mathematics, real use cases from medical to semicon, the detours worth skipping, and where event-based sensing genuinely earns its place.

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