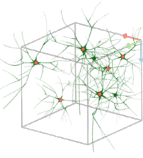
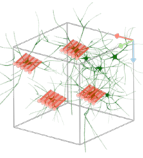
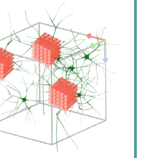


3D REGION SCANNING

FEMTO 3D ATLAS

Imaging only that matters?

	3D RANDOM-ACCESS POINT	3D TRAJECTORY AND MULTIPLE-LINE	3D RIBBON	3D SNAKE	3D CHESSBOARD	3D MULTI-CUBE
TECHNIQUES						
NUMBER OF SIMULTANEOUSLY SCANNED REGIONS	2000 cells <	up to 1000 spines	up to an 1000 μm long dendritic segment	up to 300 μm long dendritic segment	up to 300 regions	up to 30 volumes
BENEFITS IN NEUROSCIENCE	3D network imaging in large cell populations	dendritic imaging without interruption and recording activity of over 150 spines	imaging of activity in over 12 spiny dendritic segments	dendritic imaging during large amplitude movements	high speed somatic recordings, network imaging	imaging of somata during large amplitude movements

3D Chessboard scanning

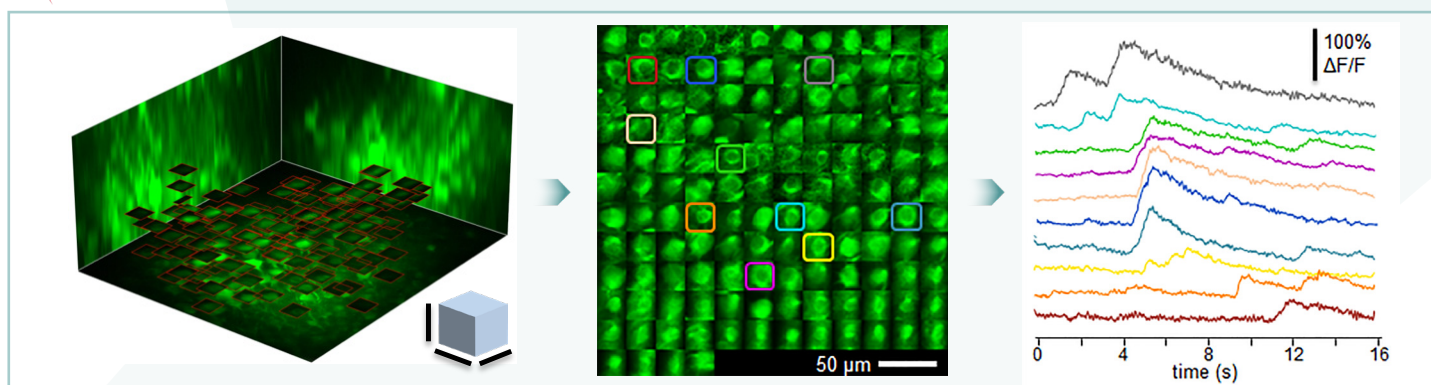


Figure 1: Chessboard scanning of neuronal networks in **behaving animals**. Left: Neurons from a mouse V1 region were labeled with GCaMP6f sensor. Neuronal somata and background areas were selected according to a Z-stack taken at the beginning of the measurements. Scale bars, 50 μm . Middle: selected frames are “transformed” into a 2D “chessboard,” where the “squares” correspond to single somata. Right: representative somatic Ca^{2+} responses derived from the color-coded regions.

3D Ribbon scanning

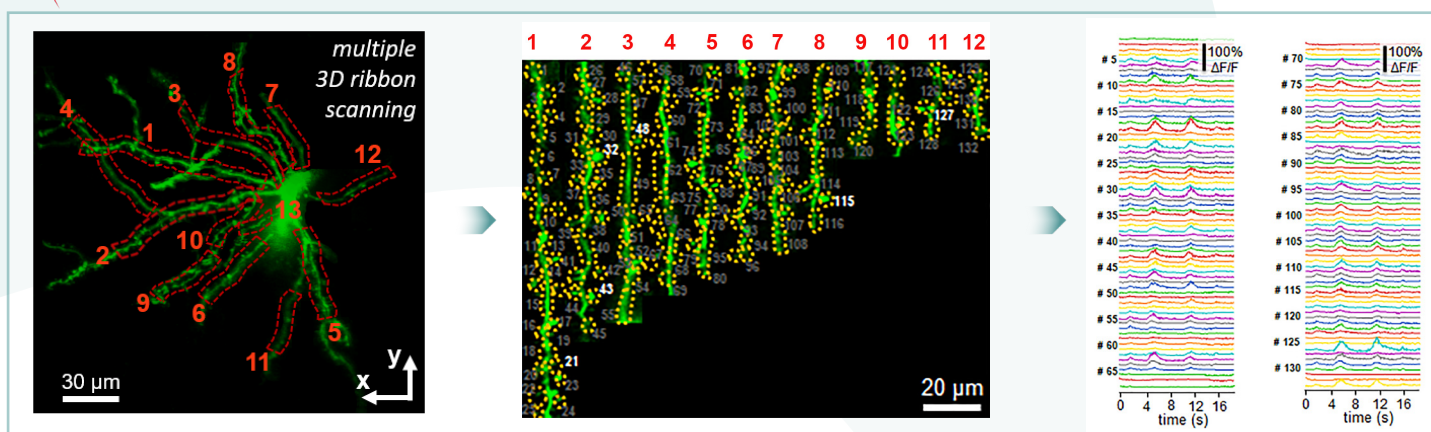


Figure 2: Imaging of multiple spiny dendritic segments with 3D ribbon scanning in behaving animals. Left: maximal intensity x-y projection of a GCaMP6f-labeled layer II/III pyramidal neuron. Numbered frames indicate the 12 3D ribbons used to record twelve spiny dendritic segments using 3D ribbon scanning. Middle: a frame from the measurement with 132 measurement ROIs on spines and dendritic segments. Right: transients derived from 132 numbered regions.

3D Trajectory-Line scanning

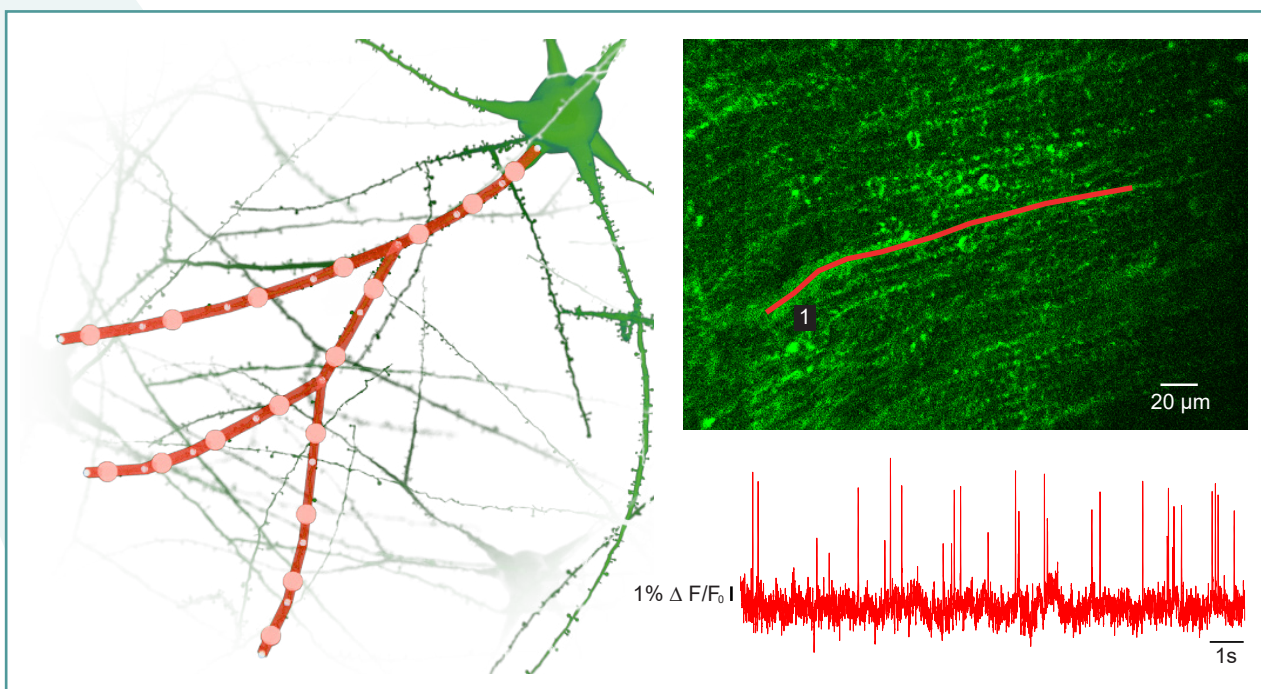


Figure 3: Trajectory-Line scanning of Purkinje dendrites. Left: Visual representation of trajectory-lines overlaying the dendritic segments. Right: An example trajectory during 2p voltage imaging of a Purkinje dendrite. A measurement trace of trajectory is shown below.

3D Snake scanning

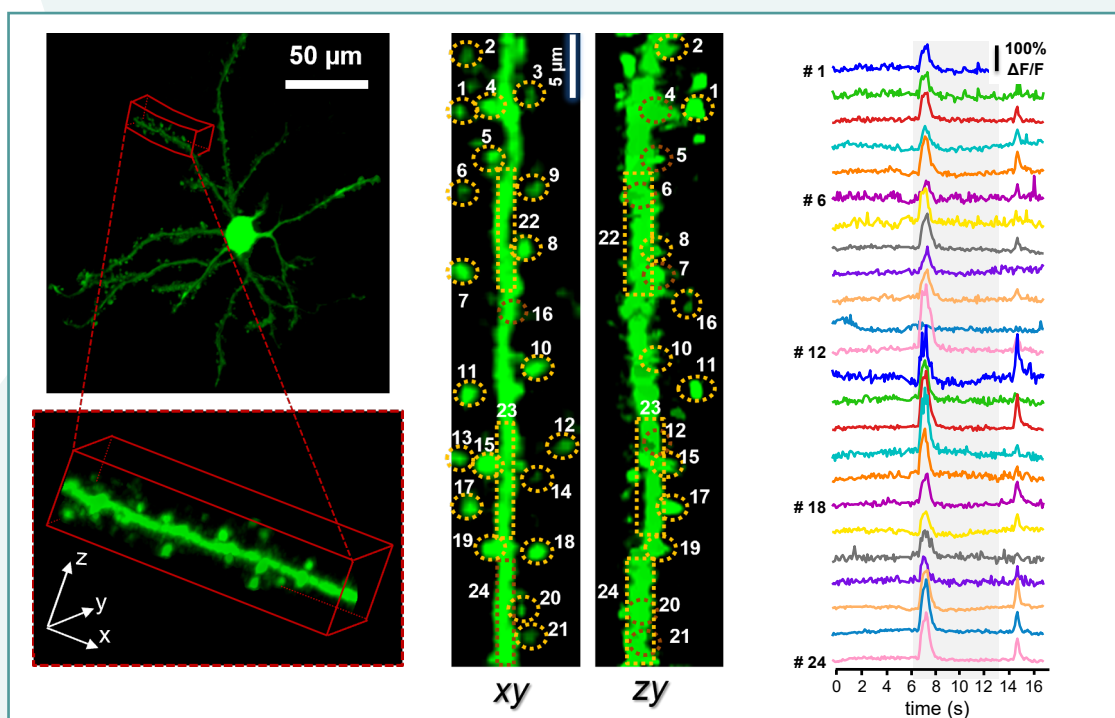
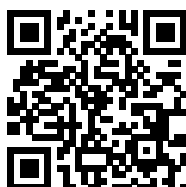


Figure 4: Z projection of a pyramidal neuron in the V1 region labeled with GCaMP6f sensor using sparse labeling. Fast snake scanning was performed at 10 Hz in the selected dendritic region. In x-y and z-y plane projections, the selected spikes to be measured are shown. Right, representative spontaneous Ca^{2+} responses derived from the coded subvolume elements.



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