

BITalino Physiological Sensor Data Analysis Report

Study Overview

- Sensors: EMG (Electromyography), EDA (Electrodermal Activity), ECG (Electrocardiography)
 - Sampling Rate: 1000 Hz
 - ADC Resolution: 10-bit (0-1023)

Data Units & Conversions

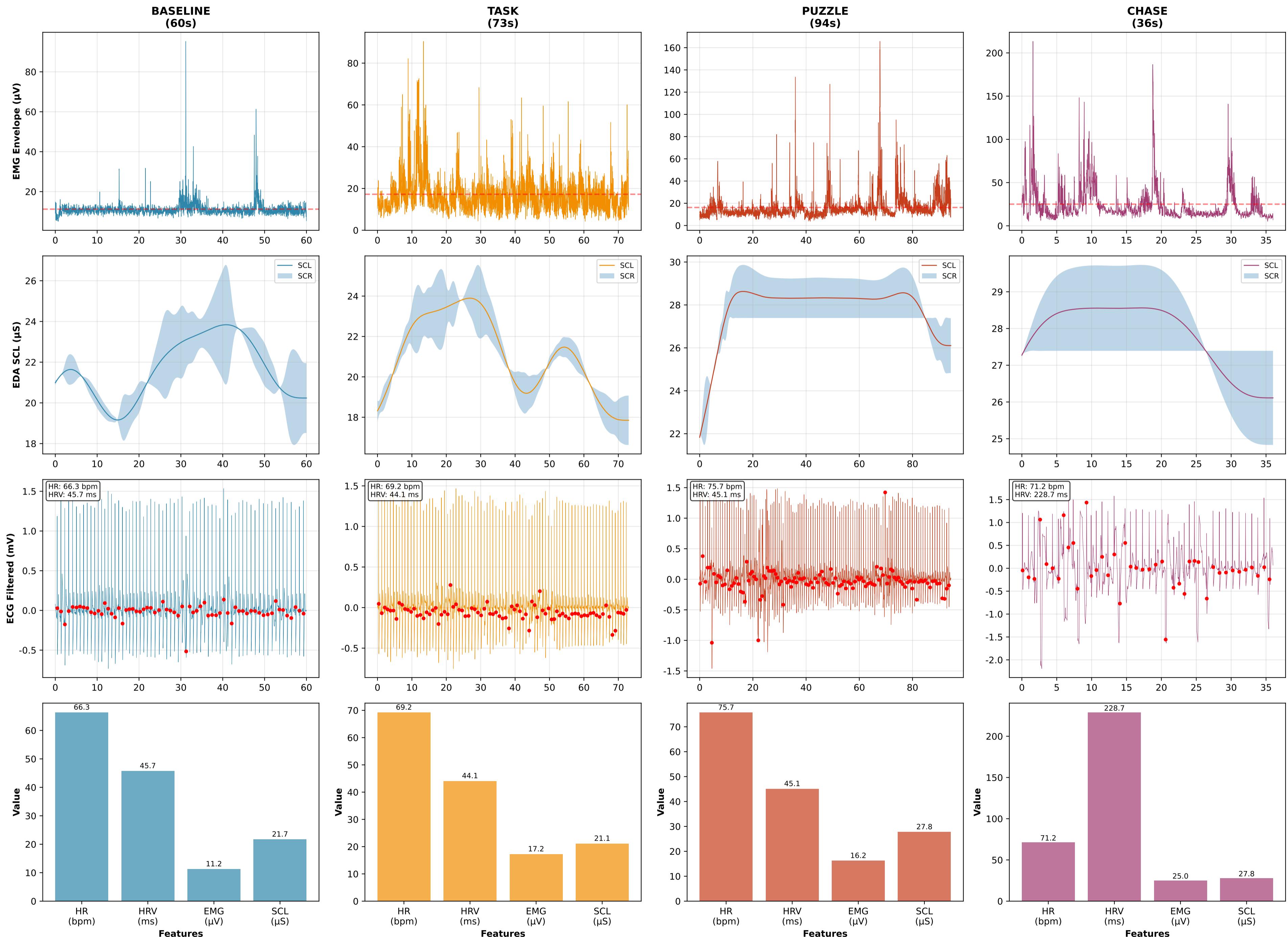
- EMG: Raw ADC → μ V (microvolts) - Muscle electrical activity
- Preprocessing: 20-450Hz bandpass → Rectification → Envelope extraction
 - EDA: Raw ADC → μ S (microsiemens) - Skin conductance
 - Preprocessing: 0.5Hz lowpass → SCL/SCR decomposition
 - SCL (Tonic): Slow-varying baseline (arousal level)
 - SCR (Phasic): Rapid fluctuations (event-related responses)
- ECG: Raw ADC → mV (millivolts) - Heart electrical activity
- Preprocessing: 0.5-40Hz bandpass → R-peak detection → HR/HRV extraction
 - Heart Rate (HR): beats per minute (bpm)
 - HRV RMSSD: Root Mean Square of Successive RR Differences (ms)

Experimental Phases

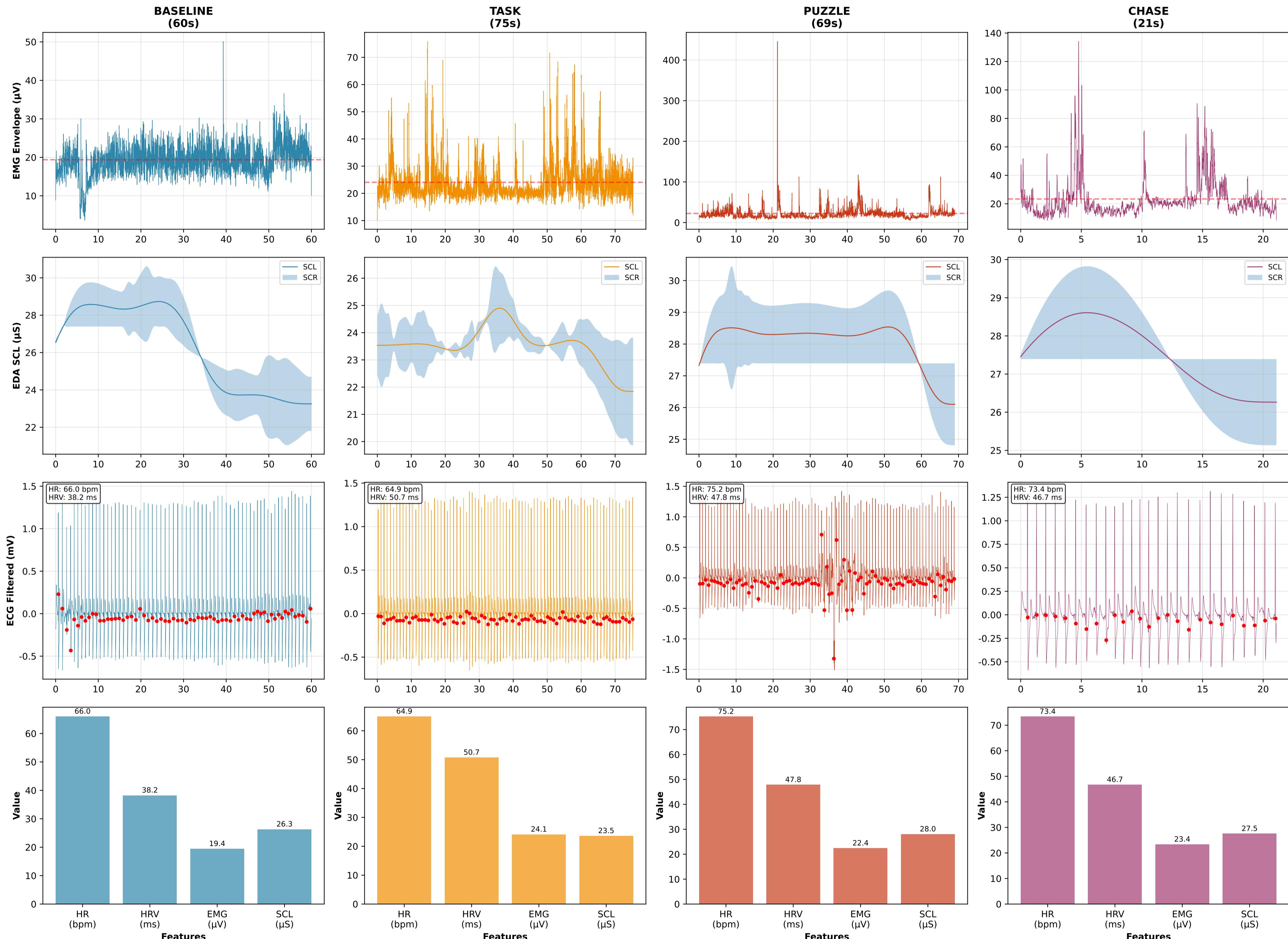
1. BASELINE (60s): Rest period for baseline physiological measurement
2. TASK: Go/NoGo cognitive task - measures inhibitory control
3. PUZZLE: Problem-solving in horror VR environment
4. CHASE: High-stress escape scenario - peak arousal expected

Subject	Phase	HR (bpm)	HRV (ms)	EMG (µV)	SCL (µS)
hase1	BASELINE	66.3	45.7	11.21	21.66
hase1	TASK	69.2	44.1	17.22	21.09
hase1	PUZZLE	75.7	45.1	16.22	27.77
hase1	CHASE	71.2	228.7	25.04	27.82
hase2	BASELINE	66.0	38.2	19.38	26.26
hase2	TASK	64.9	50.7	24.06	23.53
hase2	PUZZLE	75.2	47.8	22.41	28.05
hase2	CHASE	73.4	46.7	23.36	27.52
ishikawa	BASELINE	82.8	30.8	15.98	28.02
ishikawa	TASK	81.7	87.3	17.96	28.09
ishikawa	PUZZLE	77.8	40.8	16.24	28.20
ishikawa	CHASE	78.7	28.3	12.25	23.94
masaya	BASELINE	70.2	48.4	8.41	28.02
masaya	TASK	68.0	38.1	7.38	28.05
masaya	PUZZLE	66.7	183.5	9.54	27.87
matsumoto	BASELINE	86.7	12.3	24.06	19.75
matsumoto	TASK	84.7	12.0	25.95	21.00
matsumoto	PUZZLE	87.2	16.1	29.52	27.67
matsumoto	CHASE	86.1	16.5	21.46	27.60
sensei	BASELINE	88.3	14.4	23.54	9.05
sensei	TASK	89.5	8.4	22.91	7.55
sensei	PUZZLE	89.3	31.6	32.68	19.42
sensei	CHASE	90.4	10.4	34.88	25.32
takamiya	BASELINE	55.3	843.1	12.62	20.53
takamiya	TASK	66.6	74.2	6.16	19.82
takamiya	PUZZLE	70.7	82.1	18.69	27.92
takamiya	CHASE	76.5	99.9	13.68	27.11
takamiya2	BASELINE	68.6	113.8	3.96	24.30
takamiya2	TASK	68.7	96.6	5.95	18.06
takamiya2	PUZZLE	69.5	89.2	13.36	25.81
takamiya2	CHASE	29.0	4766.0	63.14	27.37

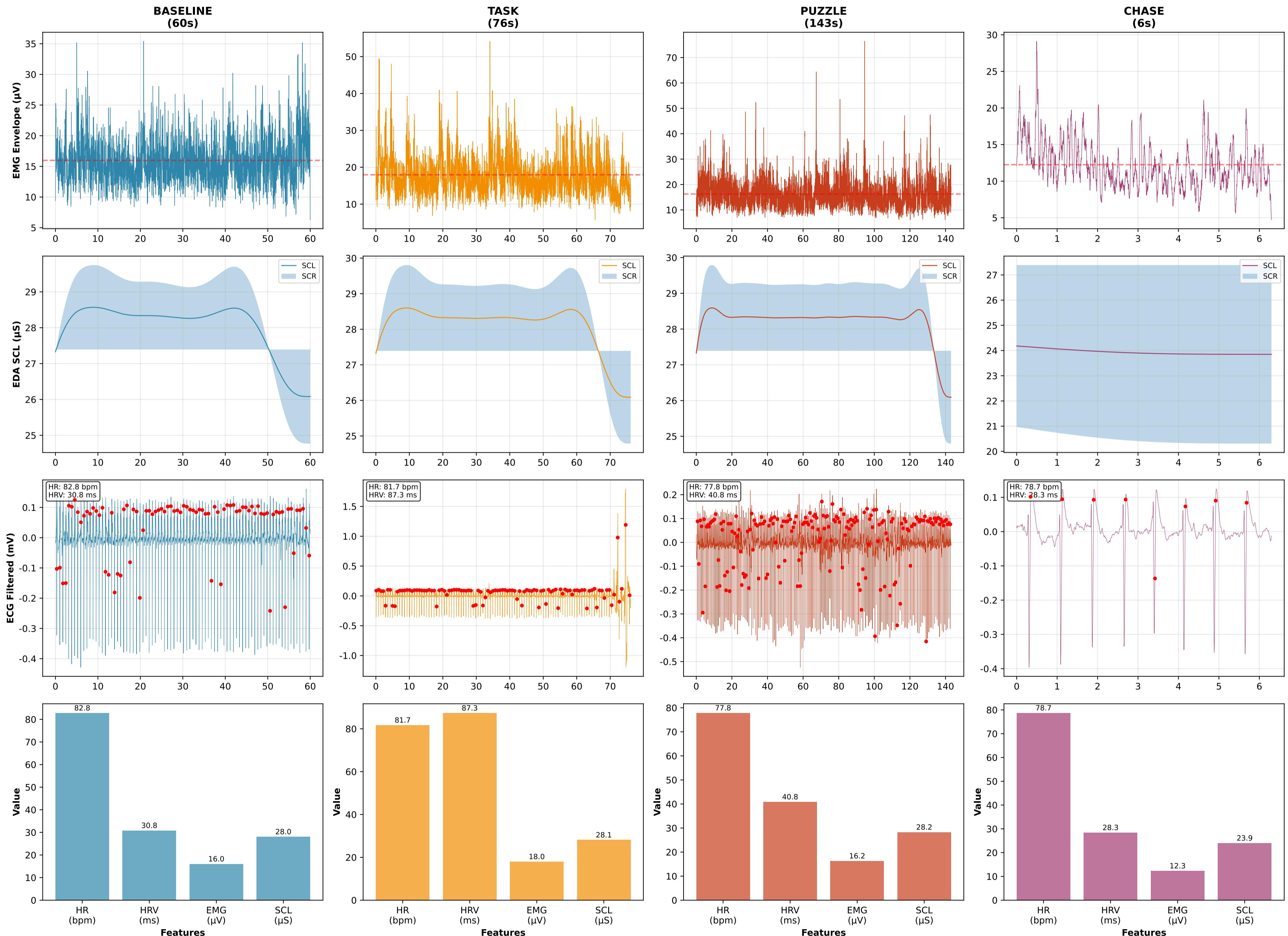
Preprocessed Sensor Data - hasel



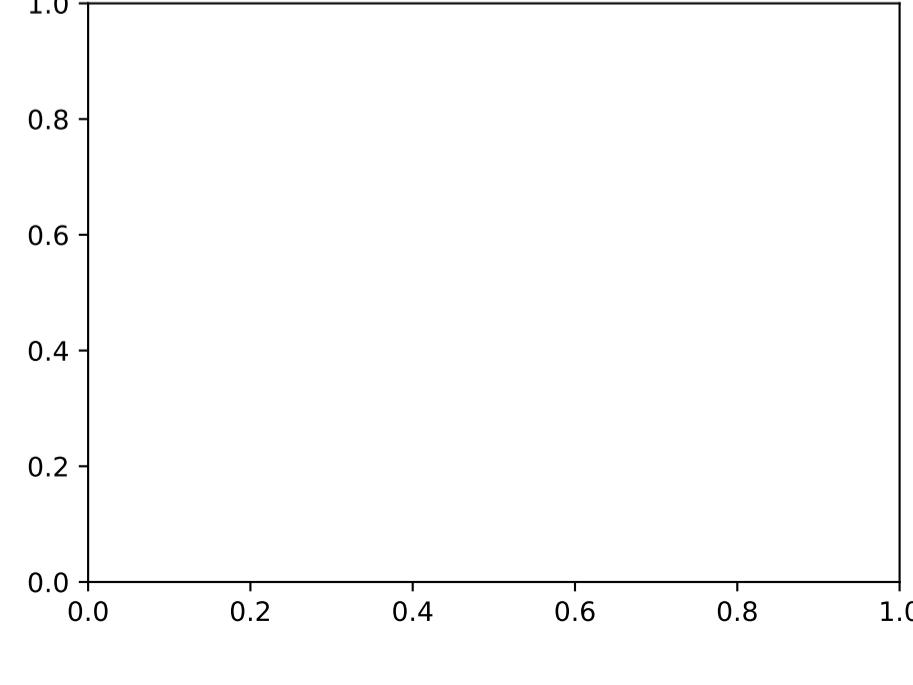
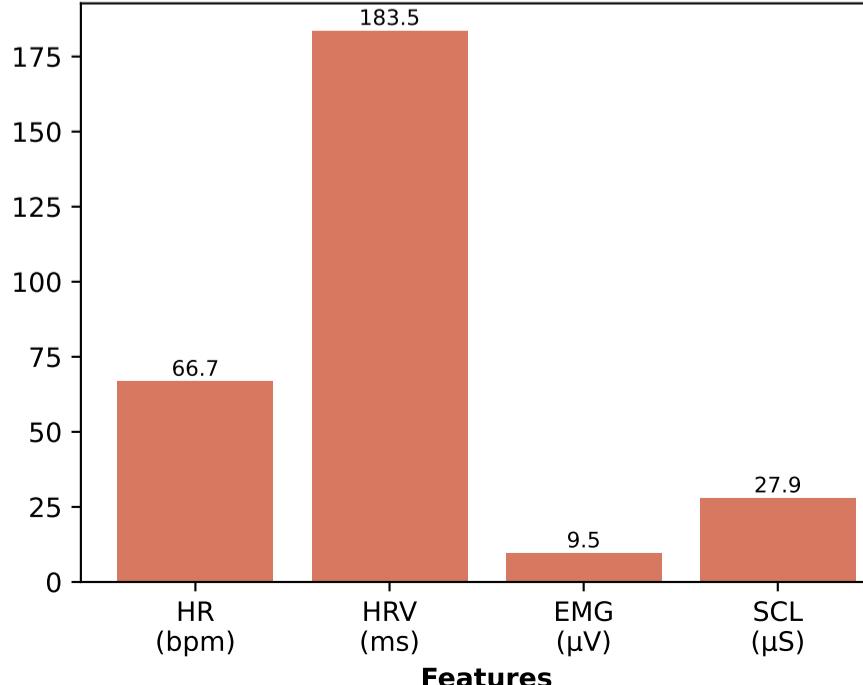
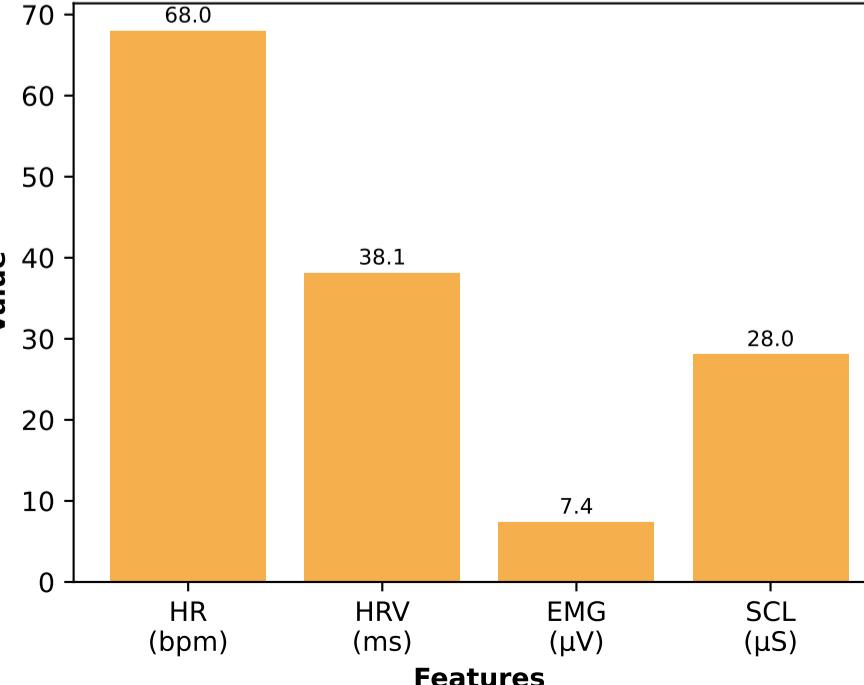
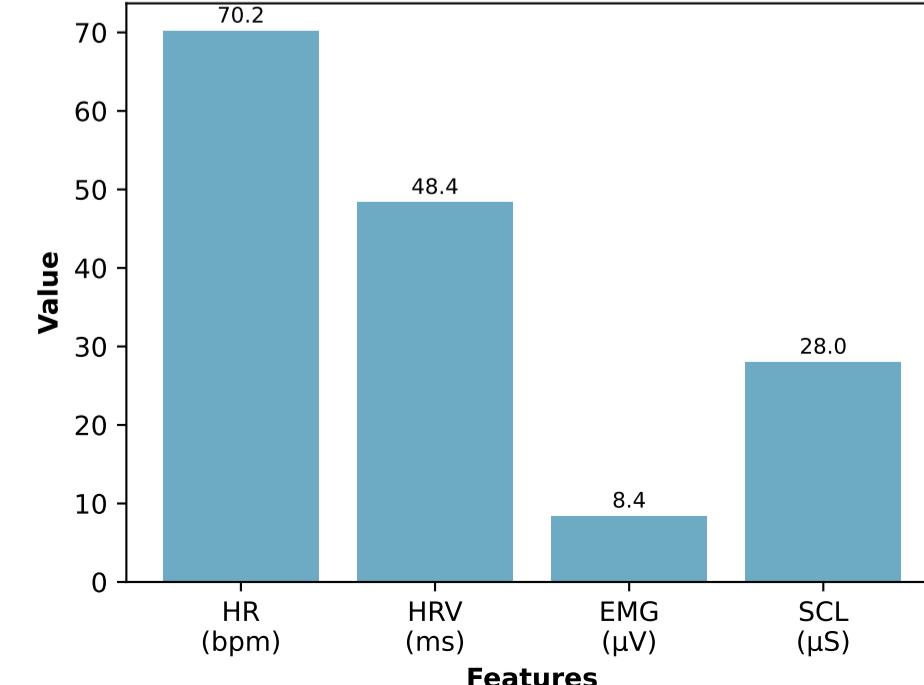
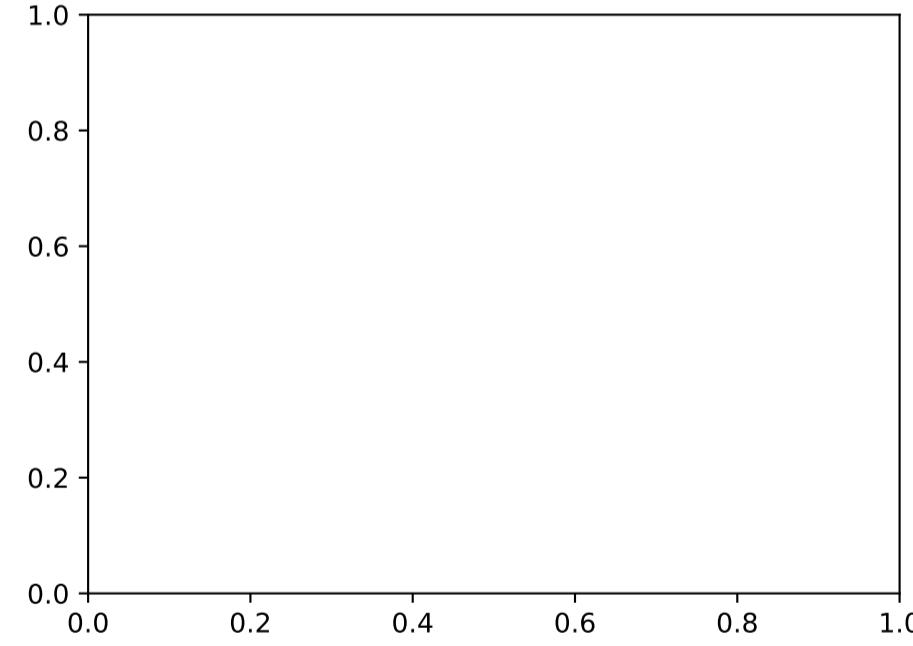
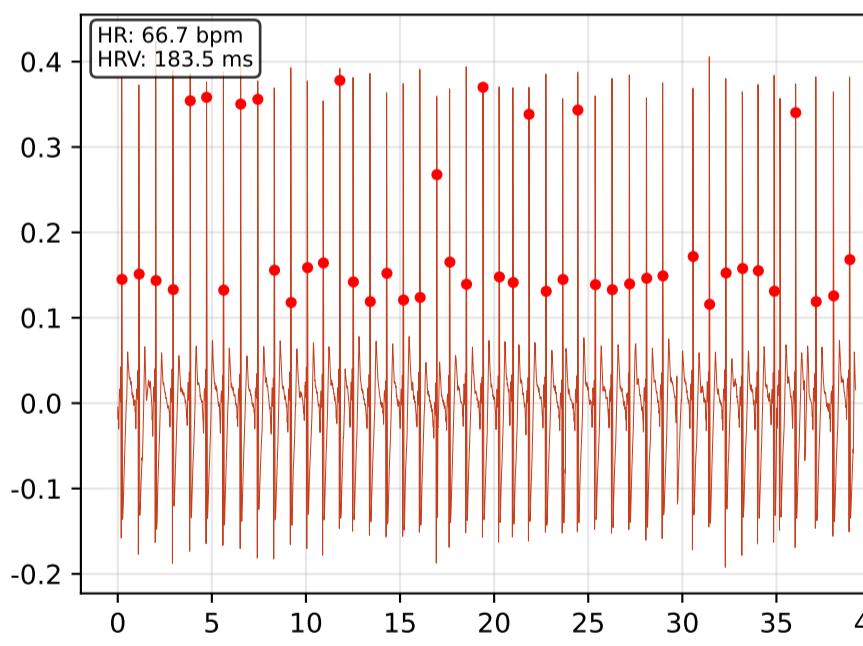
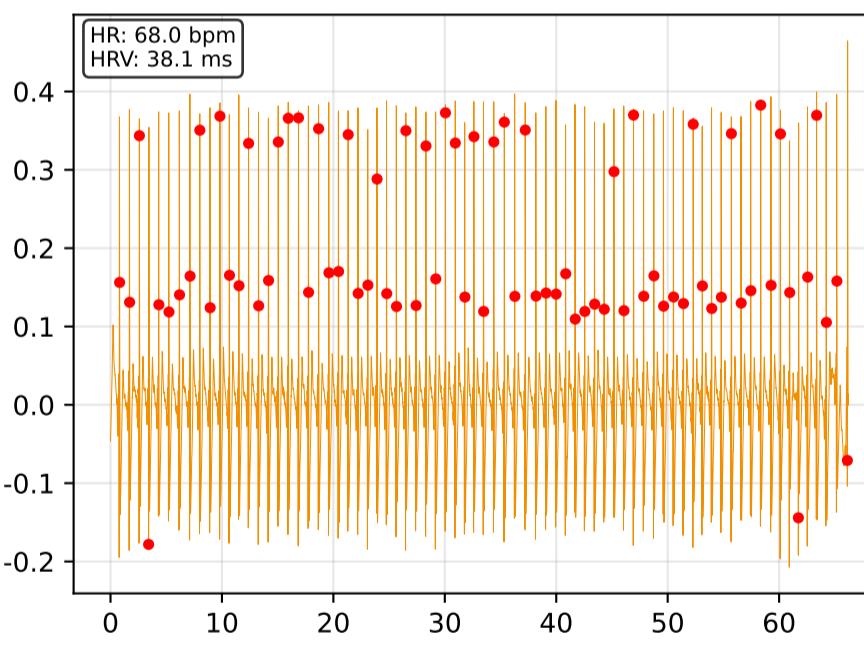
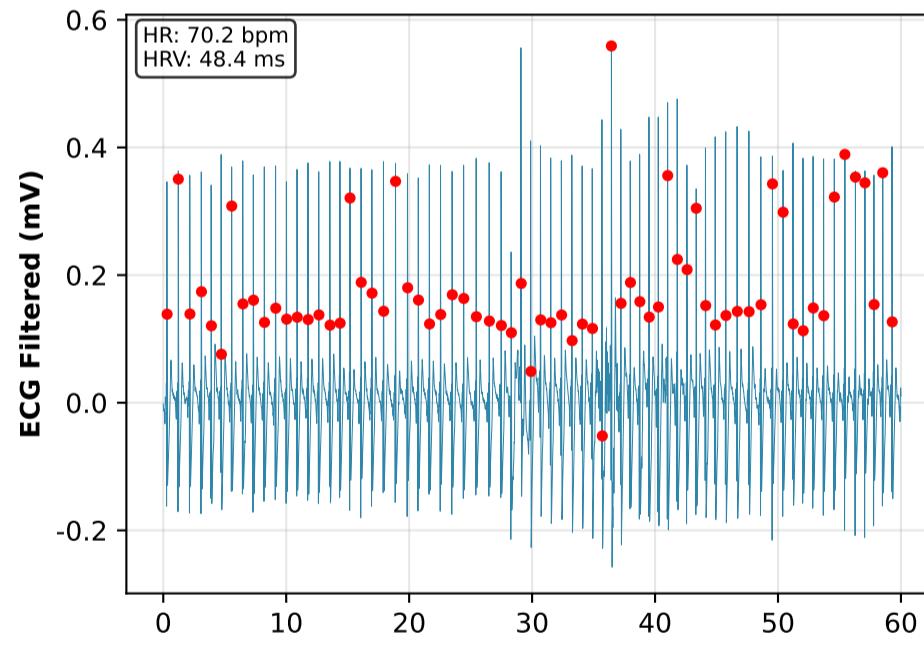
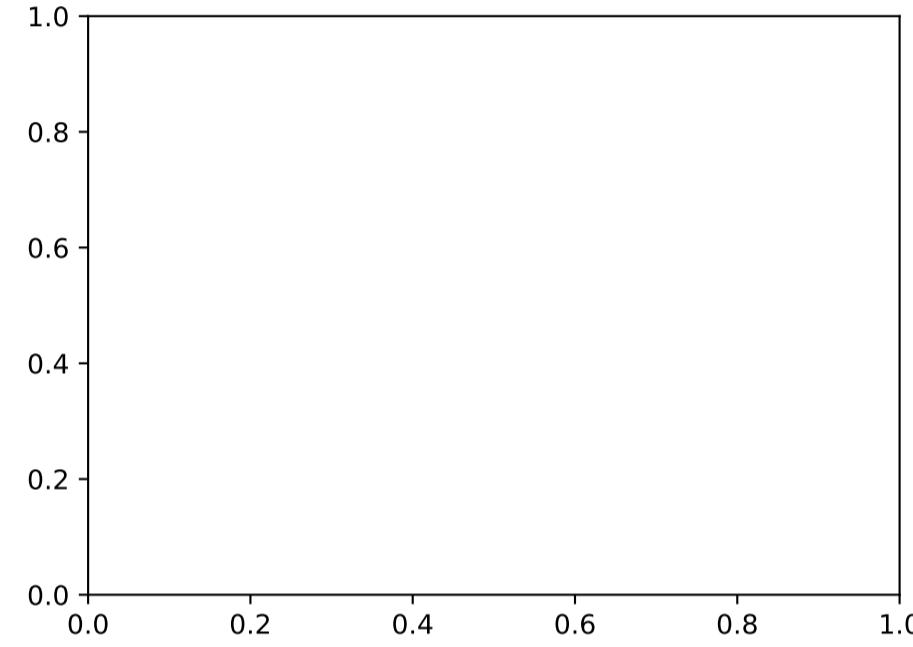
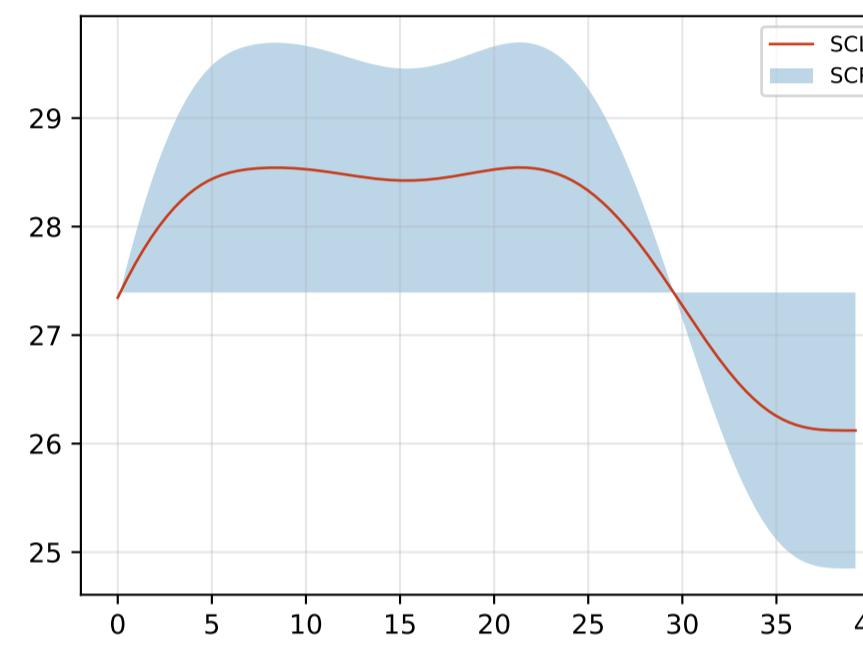
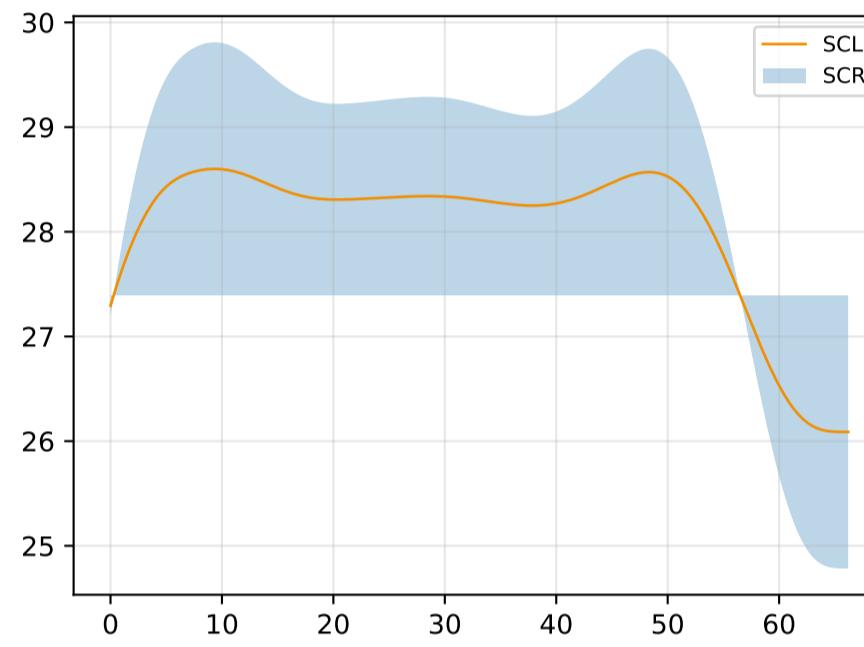
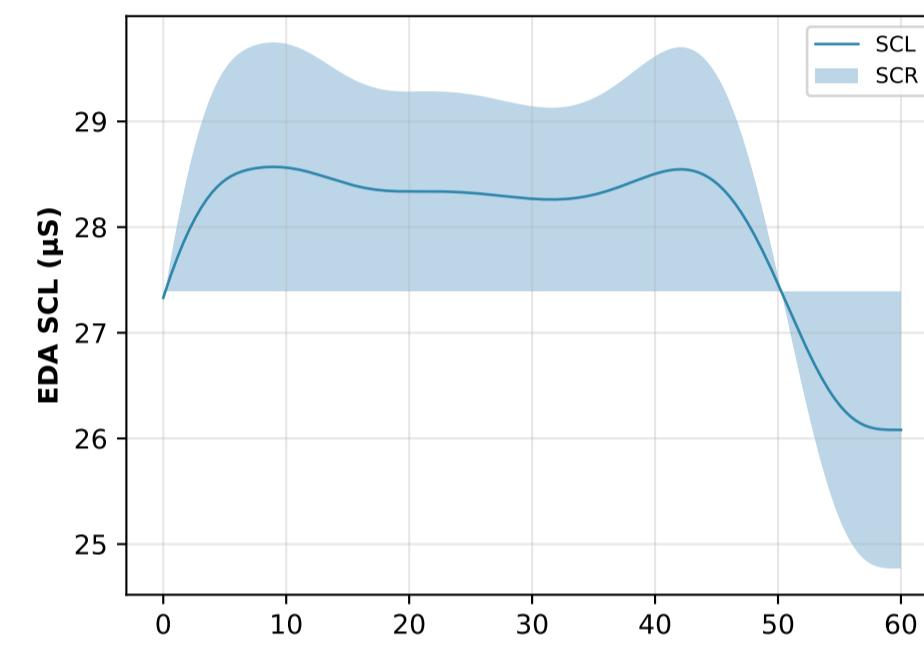
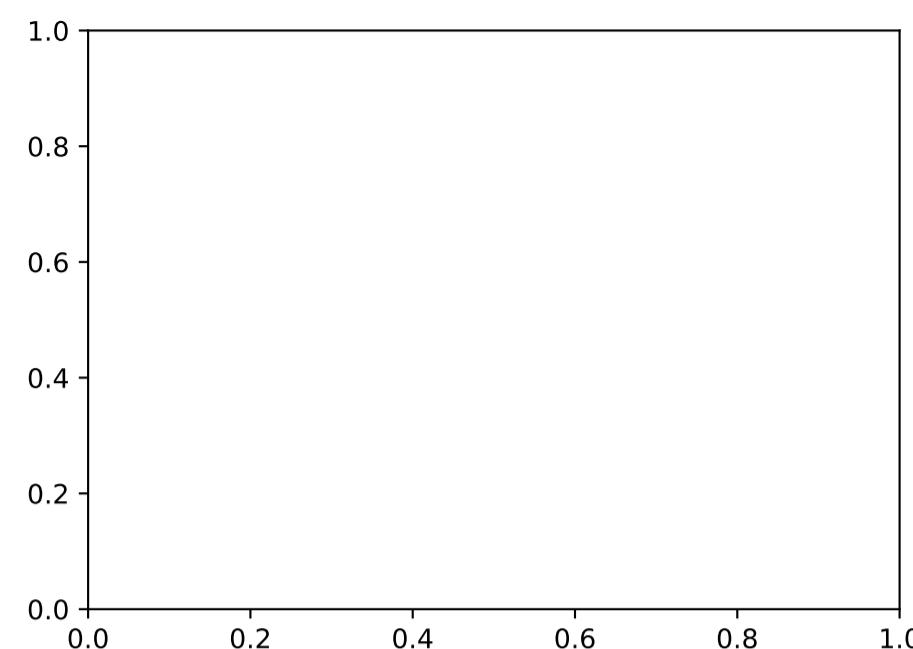
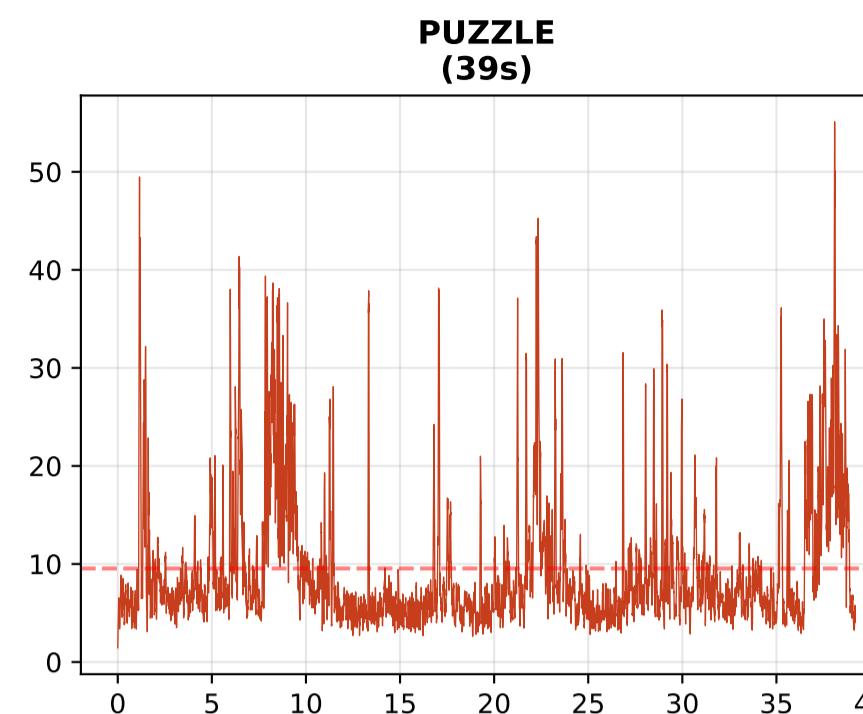
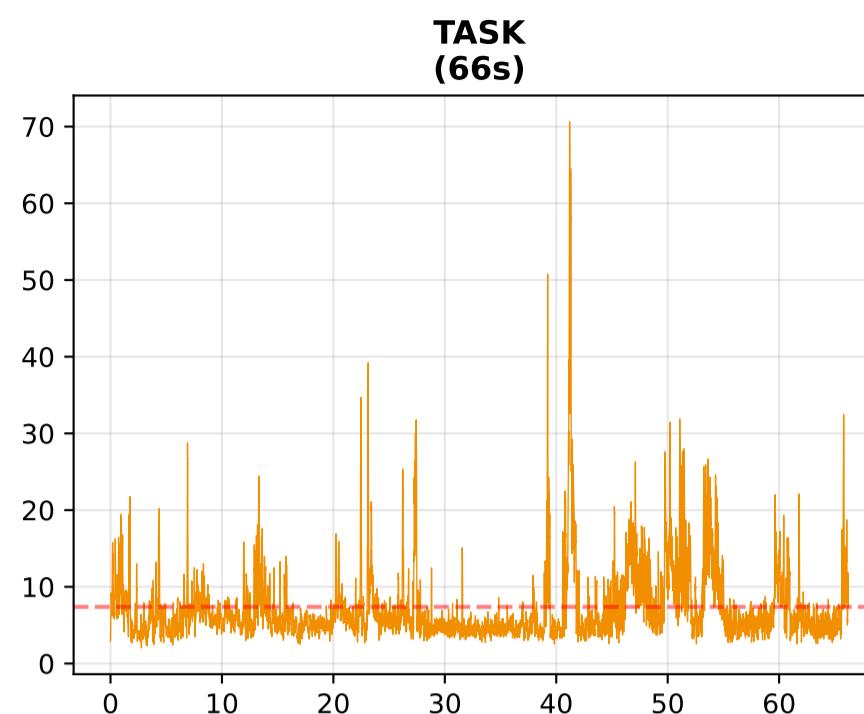
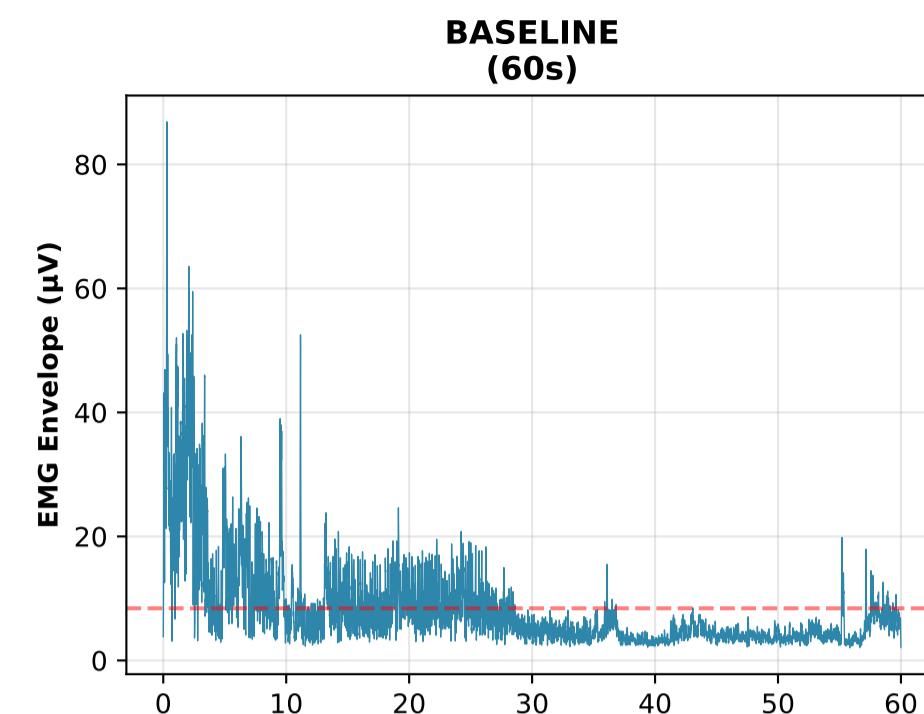
Preprocessed Sensor Data - hase2



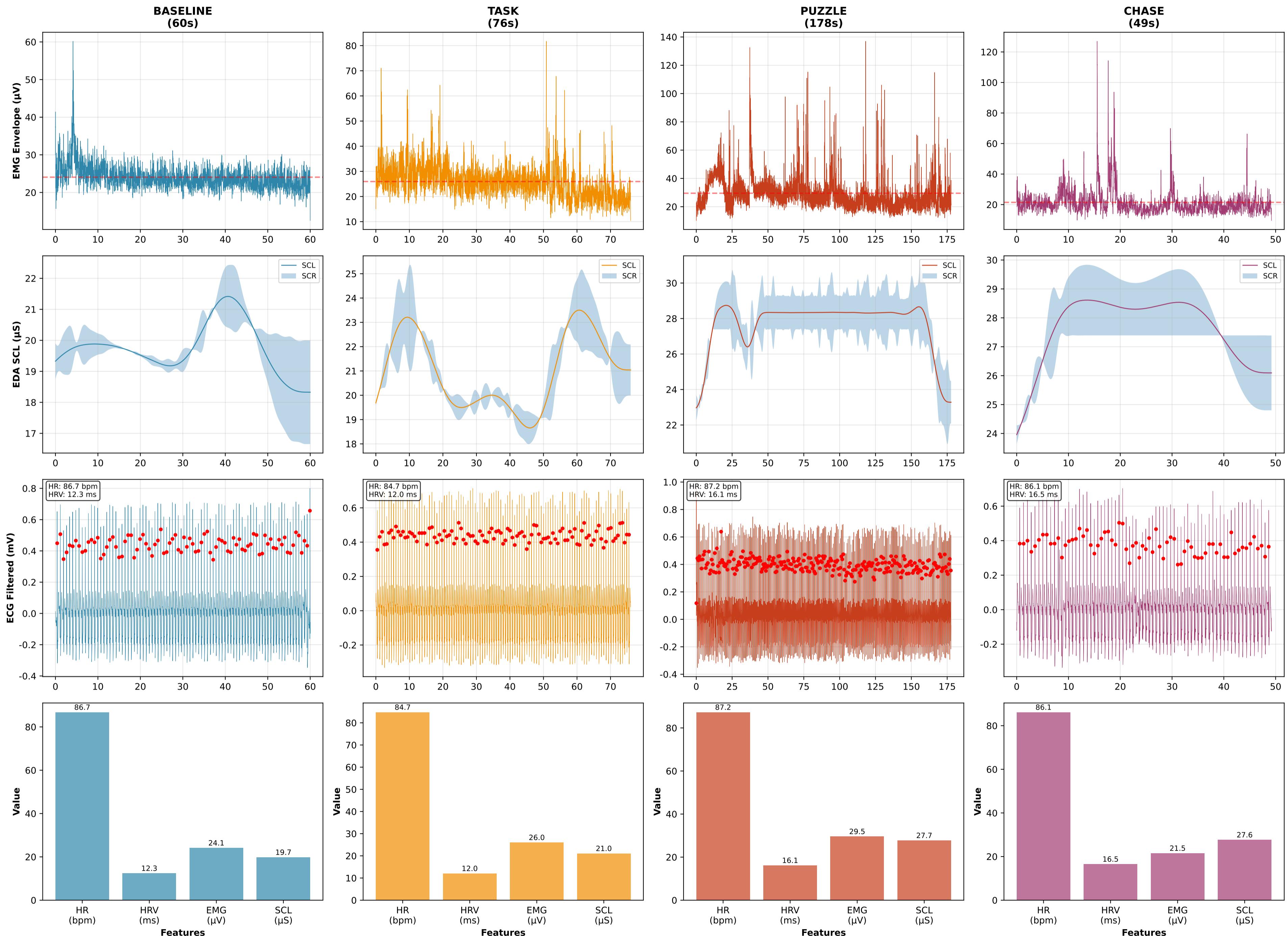
Preprocessed Sensor Data - ishikawa



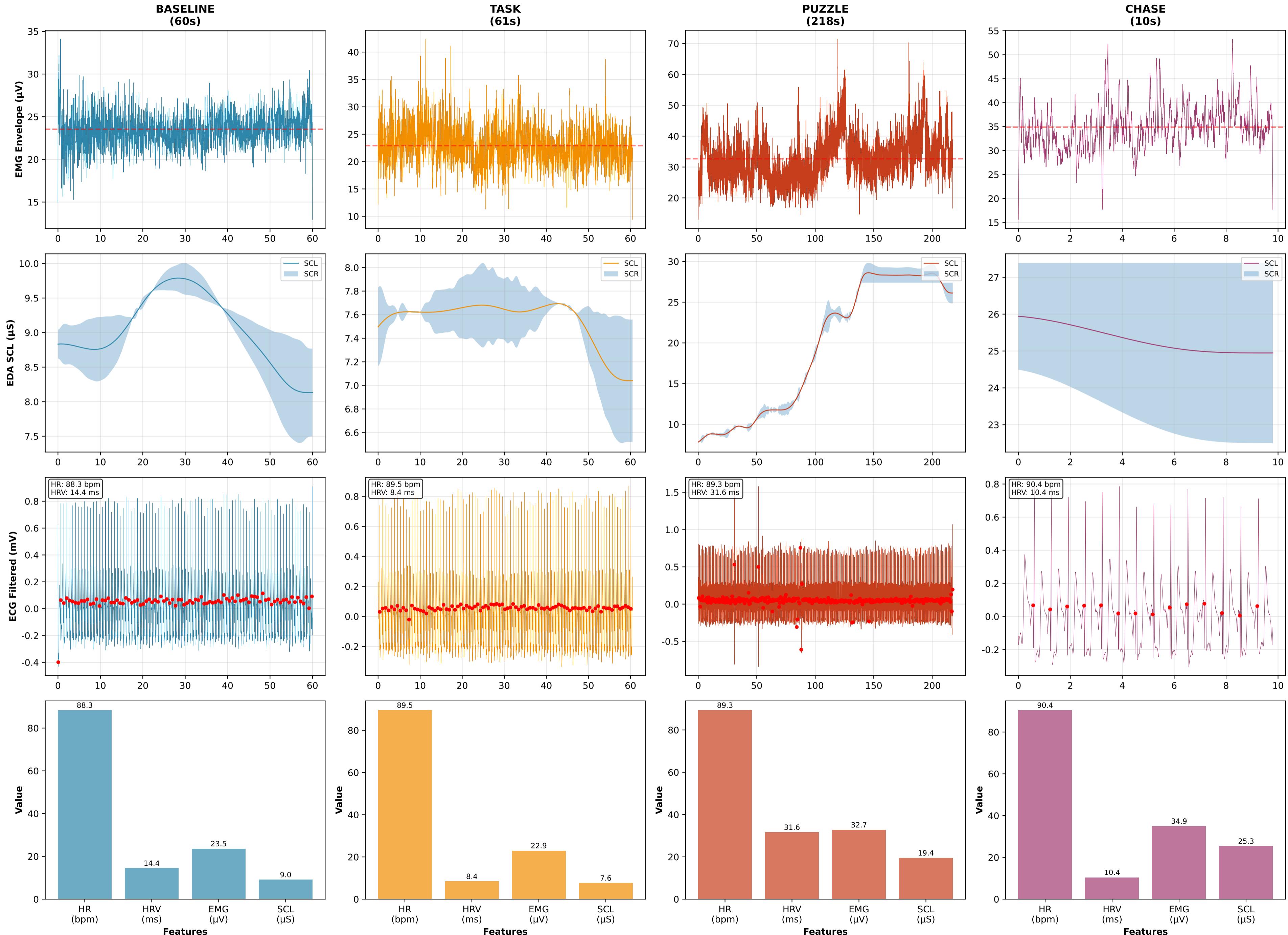
Preprocessed Sensor Data - masaya



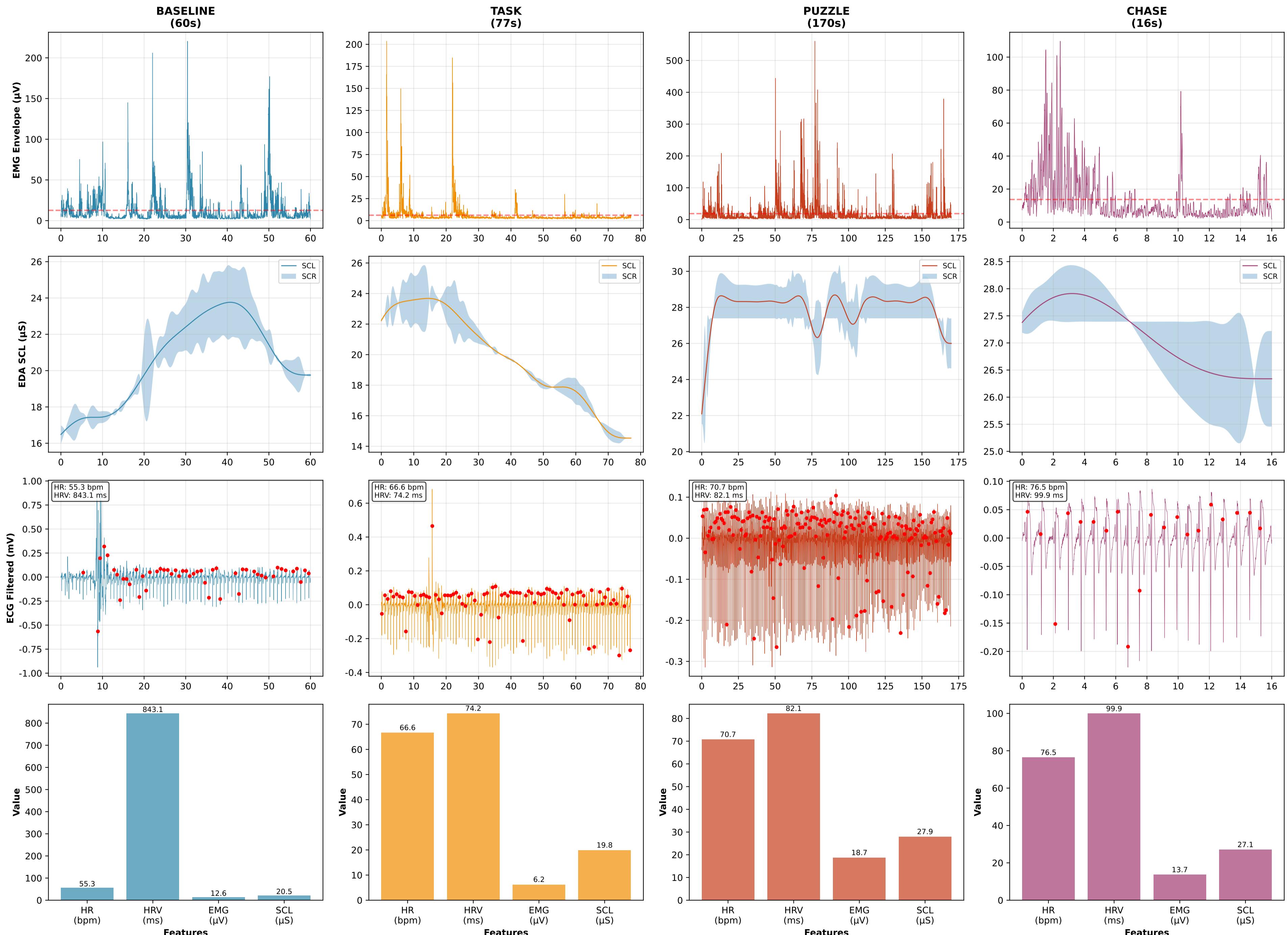
Preprocessed Sensor Data - matsumoto



Preprocessed Sensor Data - sensei



Preprocessed Sensor Data - takamiya



Preprocessed Sensor Data - takamiya2

