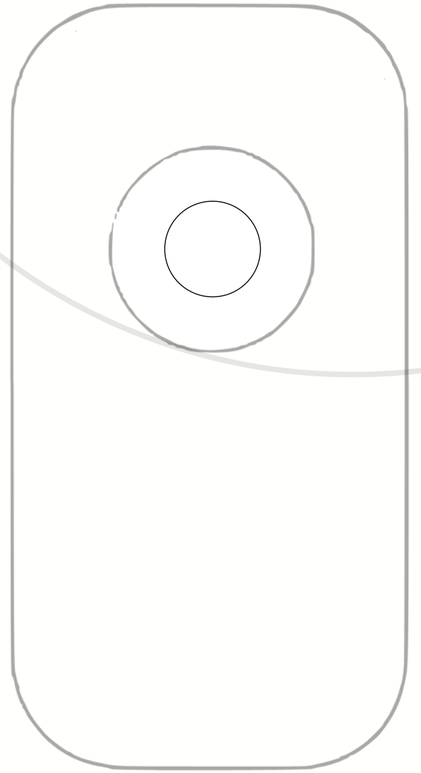

QUICK START GUIDE/ MANAUAL
OCUWEAR 1.0 - SPECTRAL LIGHT SENSOR / LIGHT LOGGER
MAY 2025

ocutune

CONGRATULATIONS WITH YOUR OCUWEAR DEVICE,
-GET READY TO REVOLUTIONIZE YOUR LIGHTING GAME

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TABLE OF CONTENT

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UNLOCK YOUR LIGHT ADVANTAGE WITH OCUWEAR: THE PRECISION WEARABLE LIGHT LOGGER.

Light profoundly impacts your sleep, mood, and well-being. OcuWEAR is the state-of-the-art wearable that makes the invisible visible, precisely tracking your light exposure – intensity, duration, and spectrum – in real-time.
Designed for seamless, multi-day comfort, OcuWEAR empowers researchers, professionals, and individuals to understand and optimize their lighting. Gain actionable insights into how light affects your circadian rhythms and physiology via our intuitive Ocutrack app or cloud analysis.
Knowing exactly how light influences your productivity and health. OcuWEAR provides this power, enabling smarter lighting choices aligned with CIE standards for Integrative Lighting.
Ready to transform your well-being through optimized light? This manual guides you through setup and data analysis. For more information, visit www.ocutune.com or contact info@ocutune.com.

PRODUCT OVERVIEW

The OcuWEAR Wearable Dosimetry Light Logger measures your light history and Integrative Lighting metrics to help improve lighting and indoor climate. It also provides light dosimetry for research focused on the effects of light on human circadian physiology. This small, lightweight, and unobtrusive device features unique light-tracking capabilities and a state-of-the-art multi-sensor array for comprehensive light measurements.

DEVICE LAYOUT

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PACKAGE CONTENTS

IN THE BOX

- OcuWear Light-Logger (with diffuser).
- USB-C Charging Cabel
- Lenyard
- Quick start guide/ user-manuel

INSTALLING THE OCUTRACK APP

To enable data collection from your OcuWEAR device using the OcuTrack app, the app must be installed on your phone.

Please note that the OcuTrack app is compatible with phones running Android 12.0 or higher.

Installation involves using the OcuTRACK APK file, which is provided by Ocutune. If you haven't received this installation file, please contact us at Info@ocutune.com for assistance.

A BRIEF INTRODUCTION TO INTEGRATIVE LIGHTING

Integrative lighting combines visual and non-visual effects of light to enhance physiological and psychological well-being.

Light influences our physiology, behaviour, mood, and circadian rhythms, affecting our ability to stay awake, concentrate, and sleep.

IMPORTANCE OF MEASURING INTEGRATIVE LIGHTING

The 24-hour light-dark cycle is crucial for regulating our internal body clock, coordinated by the suprachiasmatic nucleus (SCN) in the brain. Light input from intrinsically photosensitive retinal ganglion cells (ipRGCs) containing melanopsin, together with visual photoreceptors plays a key role in this process.

MEASUREMENT FRAMEWORK

CIE Standard S026:2018 quantifies light based on the activation of five α-opic photoreceptor types (cones, rods, and ipRGCs). This framework uses α-opic irradiances and α-opic Equivalent Daylight Illuminances (α-opic EDIs) to analyze light's circadian, neuroendocrine, and neurobehavioral effects. The OcuWEAR DEVICE measures and reports these advanced metrics.

PRACTICAL APPLICATION

Indoor light often deviates from natural light-dark cycles, with dimmer days and brighter nights. Integrative lighting aims to optimize light exposure by addressing both visual and non-visual responses to enhance overall well-being.

DEVICE FUNCTIONALITY

OcuWEAR, an integrative light measurement device, measures α-opic EDIs and image-forming (including SPD), providing insights into light's effects on physiology, behavior, mood, and circadian rhythms, beyond traditional metrics like photopic lux or CCT. This makes it suitable for research.

GETTING STARTED/ STEP-BY-STEP INSTRUCTIONS.

1. Read this manual carefully.
2. Fully charge your OcuWEAR device using the provided USB-C charger connected to a computer or a compatible wall charger.
3. Ensure the OcuTrack app is installed (see "INSTALLING THE OCUTRACK APP").
4. Ensure Bluetooth is activated on your phone.
5. Place the OcuWEAR device and your phone close together.
6. Your phone must support Android 12.0 or higher.
7. Connect the device using the app: Open the app Devices Add device Select Device from the list. The Bluetooth beacon will automatically connect the sensor. (For further instructions, see "Manage and Connect Devices".)
8. Ready to Use. (Note: For your phone to receive data from the device, it must be within Bluetooth range, the distance can vary depending on the surroundings.)

CHARGING

Upon initial use, ensure the device is fully charged, which may take up to two hours. Connect the provided USB-C cable to the OcuWEAR USB-C port and then to a computer or a compatible wall charger/power supply.

Note: For convenience, the OcuWEAR device can be charged overnight. Importantly, it will continue to measure Integrative Lighting in the bedroom while charging.

DAILY USE AND CHARGING YOUR OCUWEAR

To ensure optimal performance and longevity of your OcuWEAR Wearable Dosimetry Light Logger, proper charging before use is essential. OcuWEAR incorporates a built-in 3.7V 300mAh lithium polymer (LiPo) battery, which requires a full charge prior to its first operation.

Charging Procedure:
1. Connect the Charger: Utilize the provided USB charging cable to connect the OcuWEAR device to a USB power source, such as a computer, USB wall adapter, or other compatible power supply.

2. Charging Indicator: The charging status can be monitored within the app by navigating to the "Device" tab and then "Manage and Connect Devices" where the battery status is displayed.

3. Allow Sufficient Charging Time: A full charge from a depleted state typically requires approximately two hours for the 3.7V 300mAh LiPo battery. Maintain the connection to the power source until the battery is fully charged.

4. Disconnect from Charger: Once fully charged, disconnect the OcuWEAR device from the charger. It is now ready for use. Ensure the device is synchronized with the app and actively running.

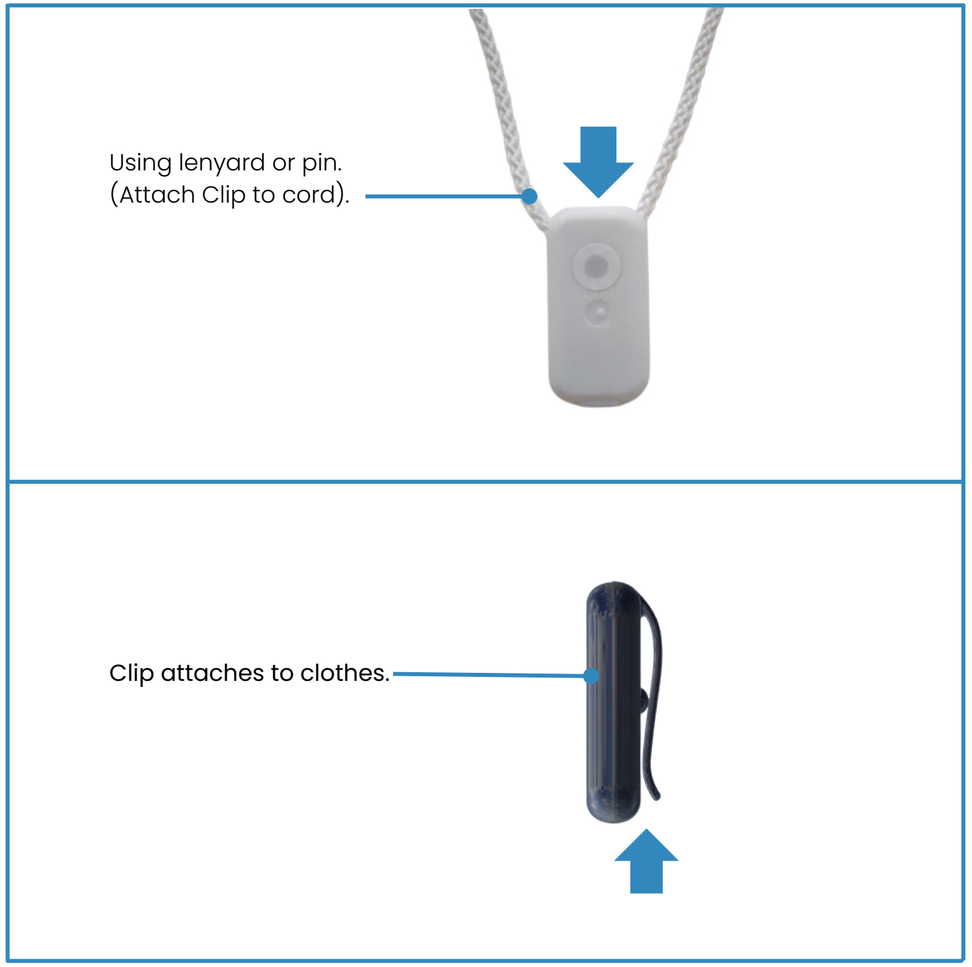
WEARING THE OCUWEAR DEVICE

The OCUWEAR device offers several wearing options. It can be attached using its clip or worn around the neck with the provided lanyard (see illustration).

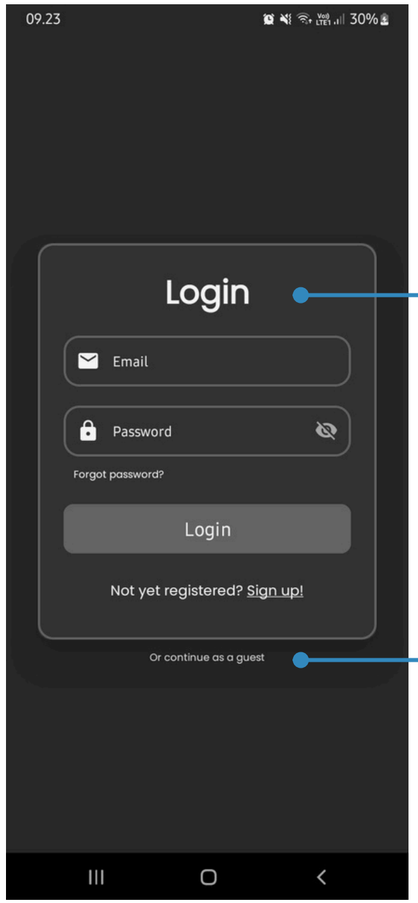
For optimal data collection, the OcuWEAR device should be worn daily during waking hours. (If you wish to gather data in your sleeping environment, the device can be placed on a bedside table at night.)
The OcuWEAR device should not be used in circumstances where it may become excessively wet or damaged (e.g., crushed).

Important: During use, the device's sensor window should always face forward. To maximize the accuracy of light measurements, position the sensor in close proximity to your head/eyes, for example, on your chest.

Wearing Options:
· Lanyard
· Clip



LOGIN AND USER-SETUP



Once the OcuTrack App is installed, there are two usage options: 1. Tracked Use and 2. Manual Use.

To utilize the OcuTrack data collection features (both within the app and for cloud uploads) and access user data, you must create a user account with a password and sign in to the app.

Alternatively, if you only require a manual, real-time reading of your surroundings via live data streaming, you may choose to log in as a guest user.

Should you just whish to get a Manual reading on of your sourroundings using livestrem of data, You may choose to log in as a guest user.

PLEASE NOTE! Make sure the device is full charged before use.

SETTING UP YOUR PROFILE AND CHRONOTYPE

CREATING AND SAVING YOUR PROFILE

When setting up your new device, you can create a user-specific profile. This profile includes key details such as Name/User-ID, Age, and Chronotype (rMEQ Score).

UNDERSTANDING CHRONOTYPE

Chronotype reflects your body's natural sleep-wake preference, driven by your internal circadian rhythms. It essentially indicates whether you are naturally inclined to be more active in the morning or evening.

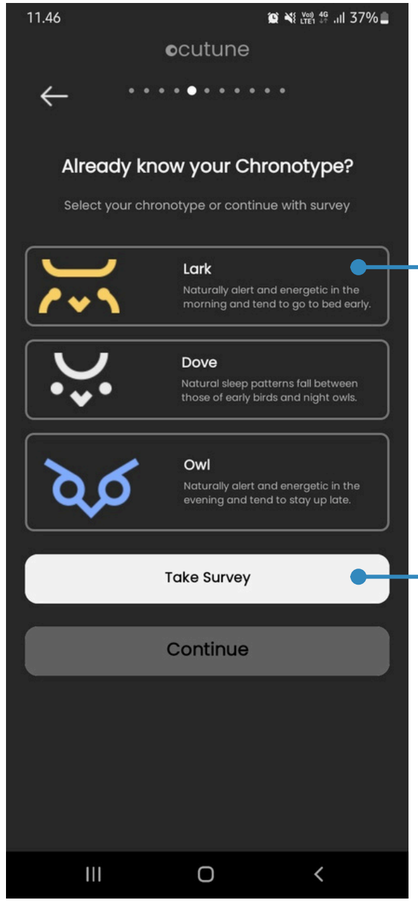
- **Eveningness (Owl)**: Tendency towards a later sleep schedule, with peak alertness in the evening.
- **Morningness (Lark):** Tendency towards an earlier sleep schedule, with peak alertness in the morning.

Identifying your chronotype is valuable for research and for optimizing light exposure to better align with your body's natural clock.

SELECTING YOUR CHRONOTYPE

- If you know your chronotype: Simply select it from the provided list.
- If you don't know your chronotype: Take the brief survey within the app. It asks a few questions to estimate your likely chronotype based on your rMEQ Score.

Understanding and selecting your chronotype can help you better synchronize your daily life with your natural rhythms, potentially improving your overall well-being.



Known Chronotype: Choose the option that best matches your profile.

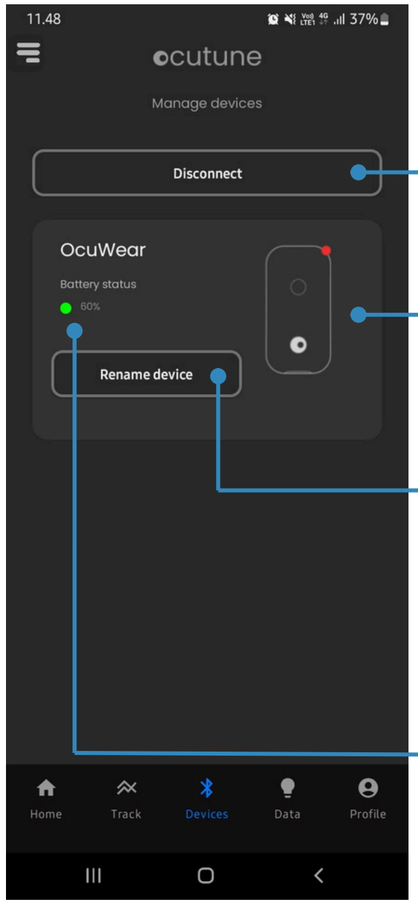
Unknown Chronotype: Take the brief rMEQ survey to determine your likely chronotype based on your rMEQ Score.

Profile and chronotype data will be displayed under the Profile tap within the App.

MANAGE AND CONNECT DEVICES

To use the OcuWEAR device with the OcuTrack App, it must first be paired with an Android device through the app. Ensure the OcuWEAR device is fully charged, then open and log in to the OcuTrack App.

To connect the device, navigate to Manage Devices using the device icon (see illustration). During pairing, keep the OcuWEAR device close to the phone and ensure Bluetooth is enabled.



Press the Connect/Disconnect button. A list of nearby devices will appear. 2. Select the desired device to connect it to the app. 3. To disconnect the current device or switch to another, press Disconnect and then connect to the OcuTrack again.

Once a device is connected, this window will display the device name and the battery status of the OcuWEAR device in use.

To rename your device, press the ‘Rename device’ button.

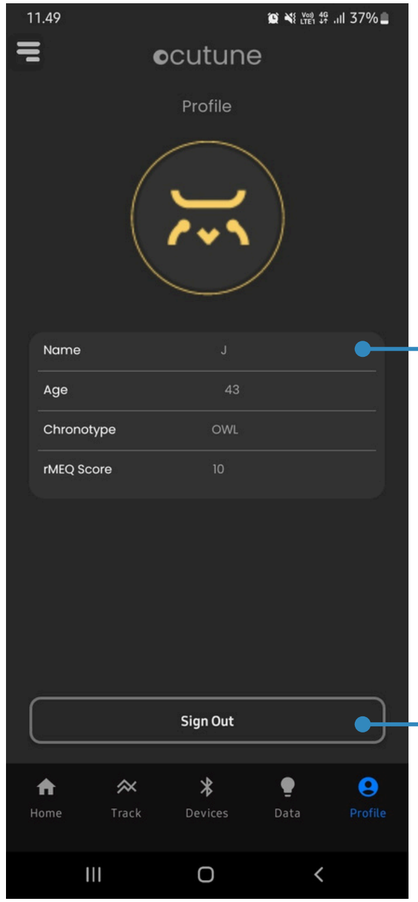
Note: The device name you assign will be used in data collection CSV files and within the cloud for easier data and user management.

Battery Status and charging indicator

PROFILE INFORMATION

The Profile page stores your information when you are logged into an account. Registered data is displayed under the Profile tab (see illustration) and includes:

- Name/User-ID
- Age
- Chronotype
- Morningness/Eveningness Questionnaire Score (rMEQ)



Profile information window.

Note: If the user's age has been provided, the light exposure target (%) will be adjusted accordingly (age-correlated targets). This adjusted target will be displayed on the homescreen (%), the track page, and under the "Light Exposure (%)" section within Devices.

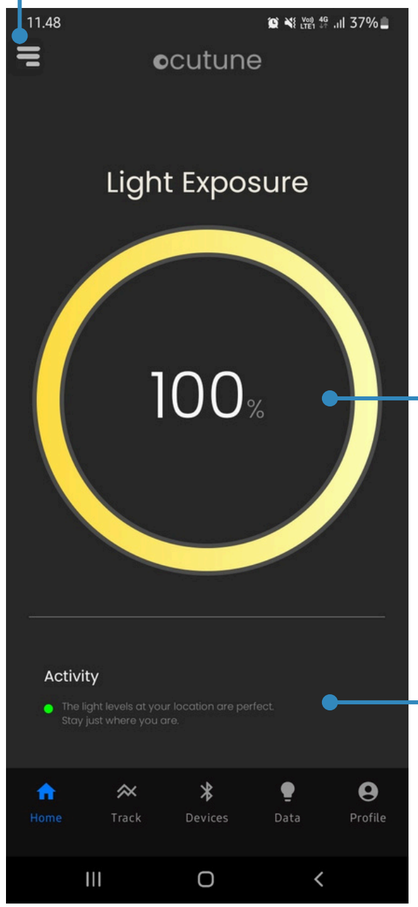
Sign Out

HOME SCREEN

The Home Screen provides a concise overview of your current Light Exposure status and your progress towards recommended values based on the latest measurement (see illustration).

Below, the Activity window offers brief, actionable advice on how to potentially improve your Light Exposure.

PLEASE NOTE: The Light Exposure recommendations displayed on the Home Screen are based solely on melanopic EDI (mel-EDI in lux) and do not encompass the full spectrum of α-opic EDI inputs as detailed in the CIE-S026:2018 Standard (see DATA).



MENU provides access to additional functions, information, and settings.

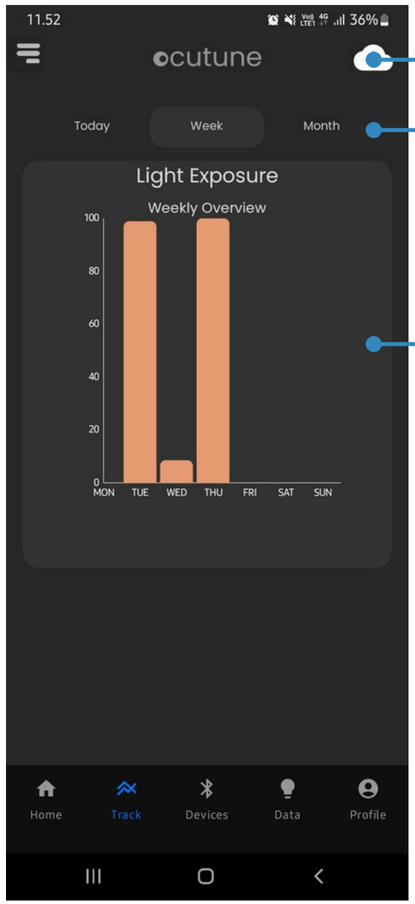
The Activity window offers brief advice on how you can potentially improve your Light Exposure.

This window displays your progress towards meeting the recommended light target (melanopic EDI in lux), based on the guidelines of the Good Light Group.

The Activity window offers brief advice on how you can potentially improve your Light Exposure.

TRACK

The Track page displays the accumulated melanopic EDI (in lux) over time. You can view data aggregated by day (active measurement period), week, and month.



Upload data to Cloud

Show data Collection today, week, month.

This chart illustrates the accumulated melanopic EDI (in lux) over the selected time period.

For detailed insights into Integrative Lighting Measurements, please navigate to the Data tab within the app.

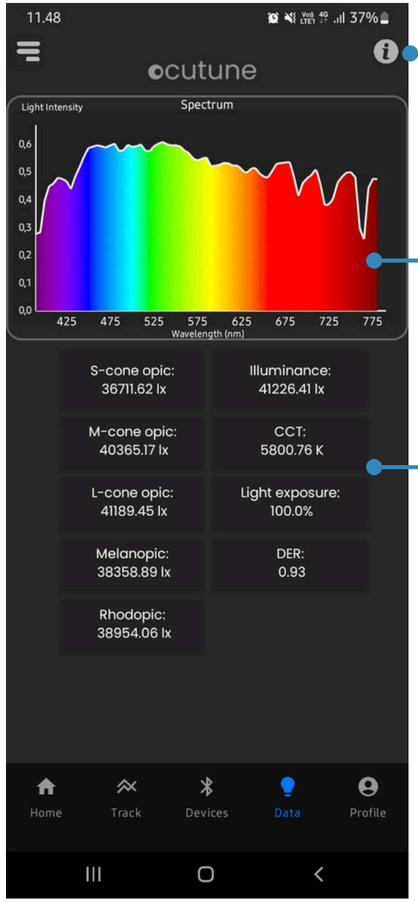
DATA WINDOW

This window displays live light measurement data, updating at the interval configured in the Settings tab (Menu -> Settings). You can view real-time measurements of α-opic illuminances, light spectrum (SPD), and visual light metrics. The following values are shown:

- S-cone opic-EDI (lux)
- M-cone opic-EDI (lux)
- L-cone opic-EDI (lux)
- Melanopic-EDI (lux)
- Rhodopic-EDI (lux)

- Photopic Illuminance in lux (Visual light Intensity).
- Color temperature (CCT) in Kelvin.
- Light exposure shows the LIGHT EXPOSURE STATUS also displayed on the home screen (% to meet recommendations of Good Light Group).
- DER = Melanopic Daylight (D65) Efficacy Ratio (CIE S 026:2018)

Note: α-opic EDI represents photoreceptor-weighted light exposure using the standardized D65 overcast daylight source (as described in CIE S 026:2018) for S-cone, M-cone, L-cone, Melanopic, and Rhodopic photoreceptors.



Further Information Button

Live Update of Visual Light Spectrum (SPD).

Integrative Lighting Measurements Display.

MENU

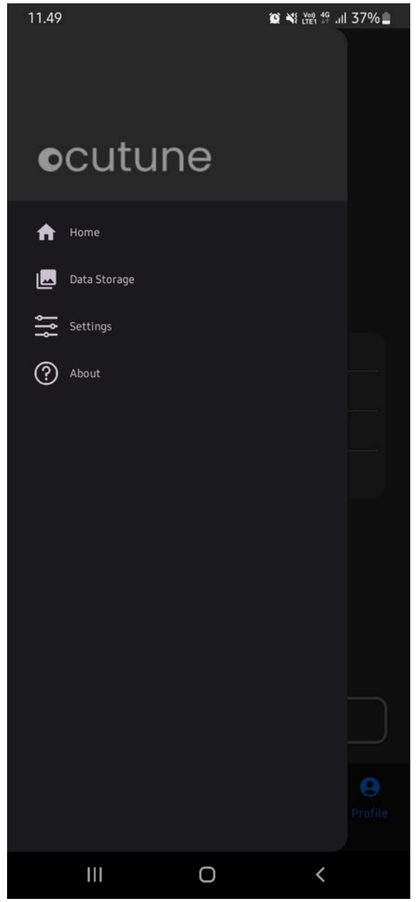
The App Menu will allow you access to:

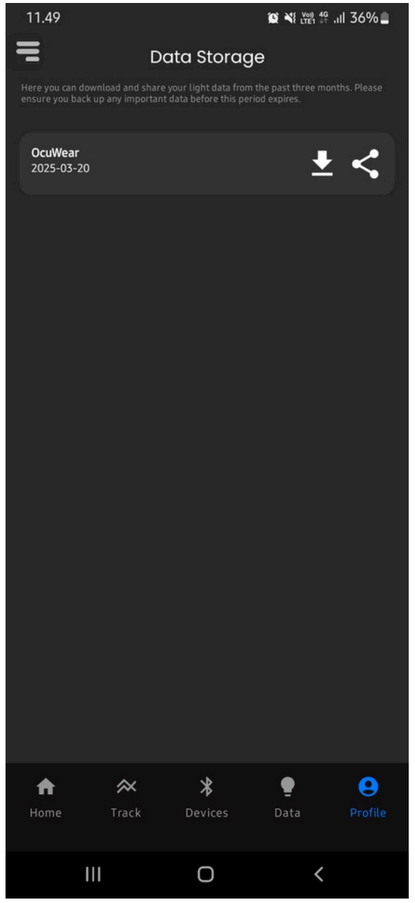
- **Home** Returns to the home screen.
- **Data Storage ->** Saves data in CSV format for download and sharing (you can select a data-time interval).
  Note! Data is stored for a maximum of 30 days before being overwritten and deleted from the device's local storage.
- **Settings** App configuration option.
- **About** Displays App information and version details.

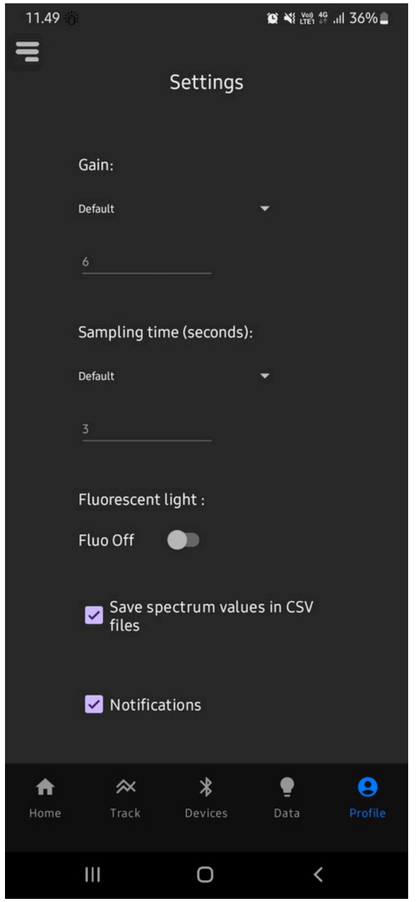
Under the **Settings** tab you have several options.

- The Settings tab offers the following options:
- Adjust Gain Control and Device Sampling Rate.
- Activate Fluorescent Light Spectrum.
- Enable Notifications.
- Enable Spectrum Data Logging: When activated, tabulated Visual SPD/Spectrum data is automatically included in the CSV file.
- *Note*: The OcuWEAR device is compatible with LightLogR (version 0.4.1), an open-source R package for personal light exposure data analysis.

Link: https://tscnlab.github.io/LightLogR/index.html







IMPORTANT SAFETY AND USAGE GUIDELINES

Please read this manual in its entirety before using the device.
Intended Use: This device and its accessories are intended solely for lighting measurement.

Precautions: Unauthorized individuals should not inspect or repair the device. Do not attempt to open, repair, or maintain the device yourself under any circumstances.
Battery:

- OcuWEAR uses a 3.7V LiPo battery, which can be hazardous if mishandled and may catch fire or explode.
- Avoid prolonged full discharge. Charge fully before first use.
- Do not leave charging unattended or use damaged charging hardware.
- Maintain an operating temperature ideally between 0-40°C.
- Battery Longevity: For optimal battery life, store batteries at approximately 40% charge and perform a full charge/discharge cycle every 20 charging cycles.

Sensor Handling:

- Do not expose the sensor to direct sunlight for extended periods.
- Avoid extreme temperatures and humidity.
- Do not immerse the device in water; adhere to the device's IP rating (see Specifications).

General Usage:

Support: For any questions or concerns, please contact OCUTUNE customer support.

Warning: Do not use the device with medical devices or in strong magnetic/electromagnetic fields. Do not crush the device or subject it to pressure.

Damaged hardware should not be used.

Keep the device out of reach of young children due to potential choking hazards. Exercise caution and avoid choking hazards when using the lanyard.

IMPORTANT INFORMATION OF USAGE

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CLEANING AND MAINTENANCE

DEVICE
Ensure the device is always used within its specified operating temperature and IP class.

CLEANING
To clean the device, use a clean, soft, non-static dry cloth. Avoid using abrasive cleaners or solvents on the sensor.

BATTERY
Fully charge the device battery before its first use. To prevent damage, avoid leaving the OcuWEAR device with a fully discharged battery for extended periods. For further battery care instructions, please refer to the "General Warnings and Precautions" section

TROUBLESHOOTING

Most issues with the OcuWEAR device can be resolved quickly by consulting the following guidelines.

Should the problem persist, please contact Ocutune support via email at info@ocutune.com for assistance.

THE SENSOR PACK IS NOT RESPONDING:

- Ensure the power adapter is securely connected and the device has been sufficiently charged. Verify the power outlet is functioning correctly.
- Inspect the sensor to ensure it is not obstructed by any objects.
- Confirm that the latest software and firmware versions are installed and being used correctly.
- If the issue persists, please refer to the warranty information or visit OCUTUNE.COM for further support resources.

THE DIFFUSER HAS COME LOSE FROM THE CASING?

- CONTACT OCUTUNE.COM for FURTHER INSTRUCTIONS, Ask for a RMA No. if under warranty. (NOTE that changes to the device itself might impact the warranty).

THE APP DISCONNECTS OFF UNEXPECTEDLY

To avoid the Ocutune APP from Turning off when in use; Please try;

- Go to SETTINGS
- Search for 'Developer Options'
- Enable "Stay Awake" Toggle.

REGULATORY COMPLIANCE INFORMATION

EU DECLARATION OF CONFORMITY

Hereby, Ocutune ApS. declares that the product complies with the Directives 2014/53/EU (CE-RED), (Battery safety) IEC 62133-2:2017/AMD1:2021 and (RoHS 2) 2011/65/EU The full information of the EU declaration of conformity can be made available by contacting: Info@ocutune.com.

WEE DISPOSAL AND RECYCLING INFORMATION

All Products, bearing this symbol, including enclosed product, are waste electrical and electronic equipment (WEEE as in directive 2011/65/EU and 2012/19/EU) which should not be mixed with unsorted household waste. Instead hand over the your waste elecrtical and electronic equipment to a designated collection point for the recycling of this waste electrical and electronic equipment (WEEE) and batteries, appointed by the government or local authorities.

Correct disposal and recycling will help prevent potiential negative consequenses to the environment and help conserve valuable materials and protect human health.

For more information please contact local authorities for more information about the location as well as terms and conditions of such collection points. Other further information including further Disassembly Guide please contact: info@ocutune.com.

DISASSEMBLY DISPOSAL AND RECYCLING INFORMATION

- The disassembly of the device must only be carried out by a qualified individual.

To disassemble the device:

- Make sure all power cords are unplugged and the device is fully discharged.
- Open the device casing using appropriate tools and make sure unnessasary preasure is not put on the battery.
- Dispose of casing under plastic material or reuse if possible.
- Use a insulated plier tool to disconnect the lipo-battery from the PCB-Board.
- Dispose of PCB-Board according to WEEE (See Disposal).
- Dispose of the battery according to WEE (See Lithium Battery Disposal).

DISPOSAL WEEE AND BATTERY

According to the WEEE Directive 2012/19/EU, All waste electrical and electronic equipment (EEE) should be collected separately and NOT disposed of with regular household waste. Dispose of this product and all of its parts in a responsible and environmentally friendly way and in compliance with the WEEE Directive 2012/19/EU.

BATTERY LITHIUM BATTERY (LIPO).

The OcuWEAR device includes a rechargeable Lithium-ion battery (3.7v 300mAh, 1.11wh).

WARNING! The battery can explode if not properly used, handled, replaced or disposed of.
Dispose of the battery according to your local regulations. Do not attempt to recharge the battery, disassemble. puncture or otherwise damage it.

Weight	14g	**Additional onboard sensing**	6 x Axis IMU (Pending Firmware update)
Dimensions (H x L x W)	46.3 x 24 x 11 mm., Clip hight incl. 15 mm.	**Dynamic Range**	~1 lux to ~140,000+ lux (d aylight ref.)
Battery/ Battery Life (Continious light-logging)	3.7V LIPO 300 MAH / APPROX. TWO DAYS PENDING DATA COLLECTION INTERVAL AND SETTING.	**Accuracy**	~2-5%
Rechargeable device	USB-C	**Connectivity**	Bluetooth 5.4 SoC (Supporting BLE & Mesh)
Sampling, interval APP / data collection	3 SEC. EPOC/ INCL. CUSTOM SETTINGS	**Processor**	nrf5340 - Dual Core
Memory Size	8 MB.	**SOC enabled protocols**	Mesh protocols like Bluetooth mesh, Thread, and Zigbee can be run concurrently with Bluetooth LE, enabling smartphones to provision, commission, configure and control mesh nodes.
Wearability	CLIP (EASY TO ATTACH)/ LENYARD		
Light sensing	Spectrally resolved AI based nano multi channel sensor 1nm spectral resolution (8-11 channels).	**Diffuser**	TR60/ near cosine transmittance, for improved light distribution over the Visual Spectrum.
Spectral range	Visable Range 380-780nm	**Temperature range**	(-10)-(+45) °C/ 14-113 °F; LIPO Chargeing (0)-(+45) °C/ 32-113 °F
Water and dust resistence IP-Class	IP20	**CIE S026:2018 Compatible/ Integrative Lighting measures**	~1 lux to ~140,000+ lux (daylight)
Certifications	CE, RHOS, WEEE	**APP Interface and Cloud data storage and Management**	YES/ INFO@OCUTUNE.COM

TECHNICAL SPECIFICATIONS

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MAUFACTURER

THIS PRODUCT IS MANUFACTURED BY OCTUTUNE APS. DENMARK.

OCUTUNE APS

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CVR. 40390766

EMAIL : INFO@OCUTUNE.COM
WEB. WWW.OCUTUNE.COM

LIMITED WARRANTY
OCUTUNE PRODUCTS, MARKETED BY OCUTUNE OR ITS AUTHORIZED COMPANIES, ARE COVERED BY A 12-MONTH LIMITED WARRANTY. FOR DETAILED WARRANTY INFORMATION, PLEASE VISIT OCUTUNE.COM.

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FURTHER SUPPORT
FOR CUSTOMER SUPPORT OR ADDITIONAL INFORMATION, PLEASE VISIT WWW.OCUTUNE.COM OR CONTACT US AT INFO@OCUTUNE.COM.

SENSOR ID - #ID_____

SUPPORT AND WARRANTY

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GET IN TOUCH!

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