

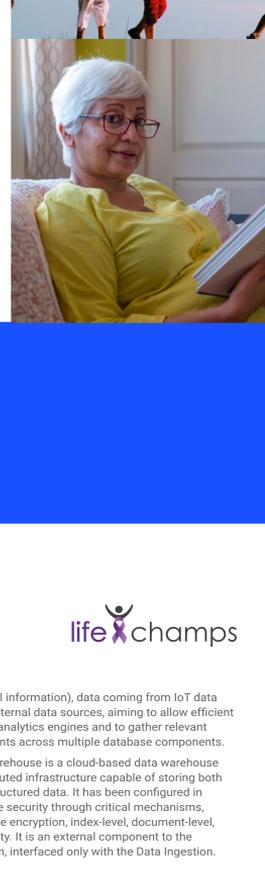
Welcome to the fourth issue of the LifeChamps Newsletter!

We are pleased to announce the publication of the fourth issue of the LifeChamps newsletter.

The LifeChamps project aims to support and deliver the highest care and QoL to older cancer patients, their caregivers, and clinicians, using emerging developments in the fields of Big Data, Data Analytics, and Artificial Intelligence. Furthermore, LifeChamps' objective is to disrupt Big Data modelling, analysis, and aggregation under a novel context-aware data-intensive and large-scale analytics framework towards delivering person-centred care solutions for three distinct types of cancer (breast cancer, prostate cancer, and melanoma), most prevalent in the older age.

Vision statement:

We believe in a society where ageist stereotypes and discrimination against older adults will be eliminated from the clinical practice.



Contents

LifeChamps Platform: 1st Integrated Version

The first version of the LifeChamps Platform consists of different integrated solutions, such as the Mobile App to collect data directly from patient interaction; the Edge Analytics Engine to collect and process data from all the sensors/devices; the Data Ingestion Pipeline transfers the processed data; the Secure Data Warehouse to store the data; the Scalable Analytics Engine which analyses data and creates ML models to predict patients' frailty; and finally, the HC Professionals Analytics Dashboard that allows the data visualization by healthcare professionals.

Mobile App

The LifeChamps App provides self-management support to cancer survivors, including patient education, personalized motivational messages, and mental health exercises. Using data captured by psychometrics and sensors, the mobile solution provides personalized recommendations to the patients.

Edge

The first version of the Edge Analytics Engine, developed by AUTH partner, consists of a Java Application, a REST API, a REDIS Database and an MQTT server. The REST API is responsible for collecting data from the available sensors (i.e., the mHealthApp [Fitbit, Withings Scale], the Movense smart T-shirt sensor and the Location sensors). The collected data are then processed by the Java Application, which uses the REDIS DB to store the intermediate values and subsequently the raw and processed are pushed to Kafka via the MQTT server.

Data Ingestion

The first version of the Data Ingestion Pipeline, developed by members of the AUTH partner, consists of an MQTT Server image, a Flink Job-manager responsible for the allocation of resources and task distribution to the workers, a Flink Task-manager that executes the tasks given by the Job-manager and a REST API responsible for the ingestion of offline/Batch data (PROMS, EHR, Patient Registrations). The data coming from the users' devices (Edge) creates a continuous stream that goes through the MQTT brokers. Flink connects with the MQTT brokers via an MQTT client and is then responsible for the aggregations and real-time streams and batch processing of the data. The processed data is then forwarded to Apache Kafka.

Secure Data Warehouse

For LifeChamps to guarantee flexible storage and communication as well as intelligent management of the stored data, EXALENS developed the Secure Data Warehouse on the cloud to ensure privacy and data security. The Secure Data Warehouse is used for integrating data from multiple heterogeneous sources, such as time-series databases (sensor

data with biomedical information), data coming from IoT data bridges and other external data sources, aiming to allow efficient access for the data analytics engines and to gather relevant data for specific events across multiple database components.

The Secure Data Warehouse is a cloud-based data warehouse management distributed infrastructure capable of storing both structured and unstructured data. It has been configured in such a way to assure security through critical mechanisms, such as node-to-node encryption, index-level, document-level, and field-level security. It is an external component to the LifeChamps platform, interfaced only with the Data Ingestion.

Scalable Analytics Engine

The first version of Scalable Analytics Engine, developed by Caggemini Engineering Portugal, was constructed just to receive data from Data Warehouse. An orchestration process sends specific queries, by Kafka, requesting data to start developing Predictive Models (for the 2nd version).

HC Professionals Analytics Dashboard

The LC (LifeChamps) Dashboard, jointly developed by Salumedia Labs, UPV and AUTH partners, is intended to be used by healthcare professionals, clinical researchers, and clinical managers and allows visualizing pseudonymized information from patients in two different manners, information reported by patients and the results of the AI (Artificial Intelligence)/ML (Machine Learning) engines.

The first version includes the patient level. The LC Dashboard allows healthcare professionals to visualize and monitor the information reported by the patients through the mobile app and the sensors. Concretely, this information includes the Patient-Reported Outcomes Measures (PROMs) and the information gathered by the different sensors deployed. Overall, sensors include an active tracker (collecting heart rate, heart rate variability, steps, activity tracking, sleep monitoring, breathing rate, skin temperature and SpO2), a smart scale (measuring weight and body composition), and home sensors (tracking ambulation and functioning).

The second version will include results based on the analysis performed by the AI (Artificial Intelligence)/ML (Machine Learning) engine deployed in the LifeChamps Platform. These results present information at the cohort level and the patient level. Combining the data collected with the mobile app (PROMs and patients' variables collected by sensors) with the clinical events from Electronic Health Records (EHRs), the AI/ML algorithms, included in the platform, analyze the data and obtain results presenting the patients' progress over time and evolution qualitatively and quantitatively at cohort level (all patients participating in a pilot). The results provided by the AI/ML algorithms will also allow healthcare professionals to monitor changes of frailty and quality of life subdomains and ill-health transitions with an emphasis on the identification of fit, pre-frail clinically and frail older cancer survivors, the quality of life and frailty models will be particular for each patient.

Salumedia Labs' Contribution to LifeChamps H2020 Project

In the LifeChamps project, Salumedia Labs is leading the Work Package 5 End-User Applications and Clinical Decision Support. This work is ongoing and includes five tasks that are:

1. Quality of Life Monitoring and Modeling. This task is led by the Aristotle University of Thessaloniki and focuses on the development of endpoints for frailty assessment in older adults.
2. Frailty Domain Knowledge Models. This task is led by Hospital Frail and the objective of this task is to use statistical analysis for identifying gradual changes in the functionality of older adults that can be used later in the daily practice of occupational therapists. The outcomes from these first two tasks (T5.1 and T5.2) will provide inputs to the analytical dashboard for healthcare professionals in task T5.4.
3. Patient-Centered Recommendation Engine. This task is led by Salumedia Labs. In it, a data-driven health recommender system is involved to help patients develop healthier habits that will help them improve

their quality of life and engage more with the mobile application that is developed later in task T5.5.

4. LifeChamps Web-Based Analytical Dashboard for Healthcare Professionals. This task is led by the Polytechnic University of Valencia, where a website (a dashboard) will be provided to healthcare professionals to present the patients' progress.
5. LifeChamps AI-based Interactive End-User Application for Quality of Life Assessment. This task is led by Salumedia Labs and it focuses on a patient-centric mobile app for health self-monitoring that provides personalized recommendations to improve Quality of Life and clinical care service via symptom tracking and perceived care experience.

In task 5.3 Salumedia Labs has produced and released a first version of the taxonomy of frailty and Quality of Life determinants that will be embedded in the recommendation engine to personalize the interventions to patients and LifeChamps end-users through the mobile app. When the solution is adapted to the taxonomy, the recommender engine will be able to choose specific motivational messages to be delivered to specific users according to their profiles and past interactions with the mobile app.

In task 5.4 the Polytechnic University of Valencia has worked on the design and development of the LifeChamps Dashboard for healthcare professionals.

In task 5.5 Salumedia Labs has been advancing on the development of the mHealth service for end-users. This mHealth service includes a mobile app for patients and caregivers with wearables integrated to monitor physical activity, heart rate, and sleep quality, among others.

Source: <https://lifechamps.eu/index.php/2021/07/06/salumedia-labs-contribution-to-lifechamps-h2020-project/>

The Role of INTRASOFT in the LifeChamps H2020 Project

INTRASOFT has the main role of System Integrator and WP6 leader in the H2020 LifeChamps Project. The main objective of WP6 is to integrate the individual software components, developed in WP3, WP4 and WP5, into a single LifeChamps integrated and fully functional platform. The main achievements of WP6 until now have been the following:

- Definition of an integration and testing plan that guides the integration, testing, and deployment activities.
- Setup of a Continuous Integration and Continuous Development (CI/CD) environment that adopts the Agile methodology and the DevOps culture to support both the development and testing activities.
- Training and provision of a user guide to the consortium for using the CI/CD infrastructure of LifeChamps.
- Integration of the software components developed in WP3, WP4 and WP5 and released the initial version of the LifeChamps integrated platform.
- Provision of a common template for describing the different tests of the LifeChamps Platform at different levels including functional and integration tests to verify the correct system-level operation and functionality of the platform.

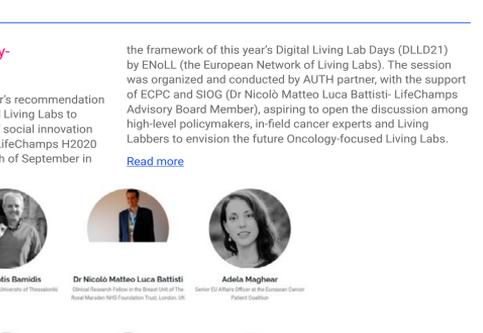
The development and staging environments will be mainly used for the development and testing purposes of the LifeChamps software components and services. They will offer an isolated environment that will allow the developers to assess how their features work together and try out improvements. Preliminary testing will happen in these environments. This method will prohibit the release of components before the developers make sure that their components work and will reduce the number of bugs before they proceed to the demonstration phase.

By adopting this approach, developers will be able to develop, debug and deploy their software components independently by defining their own automated pipelines. This way, when a software component needs to be updated and/or redeployed, the pipeline of this component is triggered and the new updates and changes to the component automatically become available.

Source: <https://lifechamps.eu/index.php/2021/10/29/the-role-of-intrasoft-in-the-lifechamps-h2020-project-magnet-platform-description/>

First Monthly Meeting for the 8P Cluster-Piloting & Engagement Working Group

At the beginning of October 2021, the 8P Cluster liaison (after the inclusion of two more projects), launched the first monthly meeting of its special-focused "Piloting & Stakeholders Engagement" Working Group. The purpose of the monthly meetings is to share knowledge, identify and brainstorm ideas to challenge or concerning pilots and stakeholder engagement, which some or all projects may face or may have already been addressed by projects that are further along in their research. Additionally, such open discussions may provide the ground



for the establishment of collaborations between all or several projects to deal with shortages or issues, as is the case already with two projects of the cluster (Clarify and Faith).

Source: <https://lifechamps.eu/index.php/2021/10/29/first-monthly-meeting-for-the-8p-cluster-piloting-engagement-working-group/>

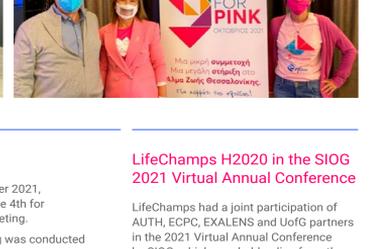
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LifeChamps Events – The Highlights

1st Expert Workshop On Frailty Dimensions

On June 16th, HULAFE, together with the AUTH team, held the 1st Expert Workshop on Frailty dimensions in the context of task 5.2 Frailty Domains Knowledge Models. The purpose of this session and the following ones is to collect the relevant frailty parameters and frailty domains for the clinicians as well as the relationship between them, involving experts in the creation of a Fuzzy Cognitive Model.

[Read more](#)



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Source: <https://lifechamps.eu/index.php/2021/10/29/first-monthly-meeting-for-the-8p-cluster-piloting-engagement-working-group/>

Workshops with End-Users to Feed the New Versions of LifeChamps Apps

LifeChamps end-user apps have already entered the final design phase, before the implementation and real-life testing, which has only been possible due to synergies between the LifeChamps clinical and technical partners. Therefore, before the release of the beta version of these apps, the preliminary feedback of the LifeChamps end-users, both older adult cancer patients and clinicians, is of utmost importance. In this framework, a first round of workshops has been conducted between the 28th of June and the 3rd of August by the LifeChamps clinical pilot partners (APC, AUTH, HULAFE, UoFG). In these workshops, the LifeChamps apps have been demonstrated to both older adults and their caregivers (the LifeChamps mobile app) and clinicians (the LifeChamps dashboard), and their qualitative feedback has been collected. A total number of 21 older adults/relatives, as well as over 19 clinicians (oncologists, nurses, healthcare managers etc.) attended the workshops in the 4 pilot sites (Sweden, Greece, Spain, UK).

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Layers Of Analysis Workshop

The data that is going to be collected during the LifeChamps pilots is of utmost importance as it will serve as the basis for the LifeChamps quality of life and frailty support monitoring and modelling. In July 2021, a series of workshops were conducted among the LifeChamps technical partners with the following goals: First, to define the list of variables that are going to be collected through the sensing devices, the LifeChamps mobile app and the electronic health records. This list includes the measurement of the heartbeat per minute, the daily number of steps, the self-assessment of quality of life and age.

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"Cancer Survivorship – AI For Well-Being" Cluster – MoM3+ On The CoVID-19 Impact

On the 10th of September 2021, the 6P - "Cancer Survivorship – AI For Well-being" Cluster initiative organized a special meeting on the exchange of knowhow and good practices, participating in the Cluster, regarding the Study Design – Data Collection/Management – Patients' Recruitment & Engagement- Piloting issues, with a special focus on the impact of the CoVID-19 pandemic on the activities of all the projects.

AUTH, representing LifeChamps H2020, led the discussion, in which also participated representatives from FAITH, ONCORELIEF & MENIR projects, presenting the current status of their projects' lifecycle and contributing to the mutual transfer of knowledge from previous lessons learnt.

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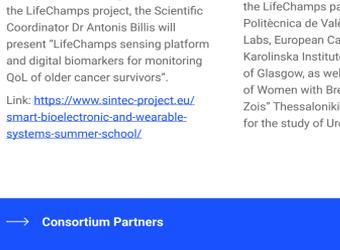


the framework of this year's Digital Living Lab Days (DLLD21) by ENOLL (the European Network of Living Labs). The session was organized and conducted by AUTH partner, with the support of ECPSC and SIOG (Dr Nicolò Matteo Luca Battisti, LifeChamps Advisory Board Member), aspiring to open the discussion among high-level policymakers, in-field cancer experts and Living Labbers to envision the future Oncology-focused Living Labs.

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Debate Session On The Oncology-Focused Living Labs

Inspired by the EC Mission Board for Cancer's recommendation for the "establishment of Oncology-focused Living Labs to conquer cancer through the acceleration of social innovation and the exploitation of new technologies", LifeChamps H2020 held a successful Debate Session on the 8th of September in



Panagiotis Bamidis (AUTH), Dr Nicolò Matteo Luca Battisti (Salumedia Labs), Sofia Maghear (Aristotle University of Thessaloniki), Antonis Billis (Hospital Frail), Despoina Mantzari (Aristotle University of Thessaloniki), and Sofia Rappou (Hospital Frail).

Technology Forum Thessaloniki & Beyond 4.0 Expo

In mid-October 2021, LifeChamps partners AUTH (iMedPhys & DataLab research groups) & EXALENS had joint participation in two parallel technological exhibitions & forums, which took place physically in Thessaloniki: the Beyond 4.0 Expo (14-16 October 2021) & the Technology Forum Thessaloniki (14-16 October 2021). In both events, LifeChamps had a strong presence, being hosted in specially designed booths, where the project's researchers presented the first demos of the LifeChamps technology to the visitors of the two exhibitions.

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Spreading The Word of the Sail For Pink-Breast Cancer Awareness Campaign -OCT 2021

In the framework of "October 2021: Breast Cancer Awareness Month", the LifeChamps Associate Partner "Alma Zois", the Association of Women with Breast Cancer of Thessaloniki (Greece), launched its annual awareness campaign, entitled "Sail for Pink". Once again, LifeChamps stood among the official supporters of this year's campaign, spreading the word of the "Sail For Pink 2021", while it was also one of the official sponsors, gaining attribution to the website of Alma Zois, also putting its logo among other sponsors in promotional materials of the campaign (advertisements, tangram puzzles etc.).

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4th LifeChamps Plenary Meeting

In the beginning of the week, and on the 8-9 November 2021, the LifeChamps partners held their periodical Plenary Meeting, the 4th for the project, and the 1st after last summer's successful review meeting.

Once again, due to the CoVID-19 restrictions, the Plenary Meeting was conducted online, but it was successful and helped all the partners to identify and set their goals, based on project's milestones for the coming period. A special focus was given on the development of the system and the preliminary data collection next month, on the occasion of the real-life pilots in Spring 2022.

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LifeChamps H2020 in the SIOG 2021 Virtual Annual Conference

LifeChamps had a joint participation of AUTH, ECPSC, EXALENS and UoFG partners in the 2021 Virtual Annual Conference by SIOG, which was held online from the 4th to the 5th of November. This year's event was entitled "Geriatric Oncology: the Past, Present and Future" and it was a very successful conference, despite the fact that it ran virtually, with top-level research & academic participation.

Highlights from the virtual conference include:

- A large spectrum of participants representing 38 countries
- 29 scientific sessions with a total of 135 talks
- Over 70 speakers and chairs from 18 countries
- 172 e-posters
- 905 tweets by 185 people, 20'200'000 impressions* mentioning #SIOG2021

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LifeChamps EP Event On The Digital Transformation Of The Cancer Health & Care Services

On Thursday 9 December 2021, the European Parliament event of the LifeChamps H2020 Project, entitled: "The role of Research & Innovation in the enhancement of older cancer patients' care & treatment options, accessibility, and Quality of Life during survivorship" took place online. The event was co-organised by ECPSC & AUTH project partners, while it was kindly hosted by MEP Tomistav Sokol (BECA Committee Member).

The focus of the event was to open the discussion over R&I in the Cancer Health & Care Digital Transformation, in the framework of the EU Beating Cancer Plan, as well as what innovation the LifeChamps project could bring towards this transformation and how it can be improved to better serve the needs of older cancer patients and caregivers.

You can watch the entire event, by following the LifeChamps YouTube link below:

[LifeChamps European Parliament Event](#) | [Read more](#)

the framework of this year's Digital Living Lab Days (DLLD21) by ENOLL (the European Network of Living Labs). The session was organized and conducted by AUTH partner, with the support of ECPSC and SIOG (Dr Nicolò Matteo Luca Battisti, LifeChamps Advisory Board Member), aspiring to open the discussion among high-level policymakers, in-field cancer experts and Living Labbers to envision the future Oncology-focused Living Labs.

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SINTEC Summer school

The SINTEC School "Smart Bioelectronic and Wearable Systems", which is co-organised by SINTEC and LifeChamps projects, aim is to show the novelties SINTEC project will bring to the Wearable sensors sector and networking with companies and other European-funded projects to discover future opportunities in the stretchable electronics market.

Speakers will present how a classic PCB technology can be turned into a stretchable smart patch, how this sensor can communicate with the latest IoT technologies and why this innovative research can be useful for healthcare and sports monitoring. On behalf of the LifeChamps project, the Scientific Coordinator Dr Antonis Billis will present "LifeChamps sensing platform and digital biomarkers for monitoring QoL of older cancer survivors".

Link: <https://www.sintec-project.eu/smart-bioelectronic-and-wearable-systems-summer-school/>

LifeChamps 1st Communication Event

On Tuesday, June 14th 2022, from 9.00 to 15.00 (local time) at Makedonia Palace Hotel, Thessaloniki, Greece will take place the LifeChamps: A Collective Intelligence Platform to Support Cancer Champions' event. The aims and scopes of the LifeChamps project and innovative aspects will be presented during the event. Moreover, the LifeChamps mobile application, dashboard, and sensors will be demonstrated. Furthermore, a round table with stakeholders will take place. The event is organised by Exalens and is being supported by the project coordinator the Aristotle University of Thessaloniki, the LifeChamps partners Universitat Politècnica de Valencia, Salumedia Labs, European Cancer Patient Coalition, Karolinska Institutet and the University of Glasgow, as well as the Association of Women with Breast Cancer "Alma Zois" Thessaloniki and the Institute for the study of Urologic Diseases.

LifeChamps in the 1st Vitalise H2020 Summer School

The first VITALISE Summer School 2022 is taking place on 6-7 July in Marathon (Athens area), Greece to support researchers and Living Lab beginners interested in applying the Living Lab methodology and tools in their studies and research. The LifeChamps project has been invited by the Vitalise H2020 Consortium to present its case study, regarding its participatory design approach and patients' involvement in the project activities (co-creation, testing towards implementation, evaluation). LifeChamps will be represented by the AUTH partner, which will also present the 1st Policy Brief on the Oncology-Focused Living Labs, a joint initiative, led by LifeChamps H2020 (and particularly AUTH and ECPSC partners), in close collaboration with SIOG, ENOLL and the THESA-HALL. More information about the VITALISE Summer School & Registrations, here: <https://vitalise-project.eu/vitalise-summer-school-2022/>

Get in Touch

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LifeChamps Project. LinkedIn Group: LifeChamps: A collective intelligent platform to support cancer champions. @LifeChampsH2020. LifeChamps-H2020.

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