



DELIVERABLE REPORT

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Project acronym: LUCA

Project title: Laser and Ultrasound Co-Analyzer for thyroid nodules

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Project website address: www.luca-project.eu



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1) Introduction

The purpose of this deliverable is to provide an overview of the LUCA project's dissemination activities during the second year of the project between February 1, 2017 and January 31, 2018. It summarises the progress and deliverables related to all project-related outreach, communication and dissemination activities.

2) Dissemination Activities Year 2

This section provides a detailed account of all dissemination activities undertaken during year 2 of the LUCA project including publication of scientific papers, newsletters, dissemination material, and the project website as well as dissemination activities at conferences and congresses and on social media.

a. Publications

i. Scientific Papers

During the second year of the project, the scientific partners published and/or submitted one journal article related to the LUCA project:



#	Type of scientific publication	Title of the scientific publication	DOI	ISSN or eSSN	Authors	Title of the journal or equivalent	Public & private participation	Peer-review	Status	Open Access
1	Article in Journal	Time-resolved near infrared light propagation using frequency domain superposition	https://doi.org/10.1364/BOE.9.000041		Stanislaw Wojtkiewicz, Turgut Durduran, and Hamid Dehghani	Biomedical Optics Express	Yes	Yes	Published	Yes - Green Open Access





ii. Promotional and Information Material

A range of promotional material was developed in the first two years of the project, including a fact sheet, a roll-up and a flyer with relevant, general information about the project (see also D6.1 Dissemination material, D6.5 Report on Dissemination Activity Y1). All dissemination material is available for download in the Press and Media section of the LUCA website. A first flyer was created in M3 of the project. After the first project year, an updated version (Fig. 1+2) was designed and distributed at several conferences related to LUCA, including the European Congress of Radiology 2017 and the Congress of the European Society for Radiotherapy and Oncology 2017.

PROJECT OBJECTIVES

LUCA aims to develop and bring to the clinic a state-of-the-art portable device for thyroid cancer screening and an improved and more accurate diagnosis of thyroid nodules.

This cost-effective and novel solution will combine ultrasound and near-infrared diffuse optical technologies in a single device and a hand-held probe that enables multimodal data acquisition.



PROJECT FACTS

Coordinator: Prof. Turgut Durduran, ICFO – Institute of Photonic Sciences (ES)
 Duration: 48 months
 Runtime: February 1, 2016 – January 31, 2020
 Total EU Funding: €3,628,845.75

CONSORTIUM

ICFO – Institute of Photonic Sciences (ES);
 Politecnico di Milano (IT);
 Institut d'Investigacions Biomèdiques August Pi i Sunyer (ES);
 Hemophotonics (US);
 VERMON (FR);
 Echo Control Medical (FR);
 University of Birmingham (UK);
 European Institute for Biomedical Imaging Research (AI)

*For more information visit www.luca-project.eu
 or contact the Project Office kkrischak@eibir.org*

#LUCAproject

PHOTONICS²¹

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 688303.

*The LUCA project is an initiative of the Photonics Public Private Partnership
www.photonics21.org*

**LASER AND ULTRASOUND
 CO-ANALYZER FOR
 THYROID NODULES**

For further details see www.luca-project.eu

Figure 1: LUCA Flyer front view

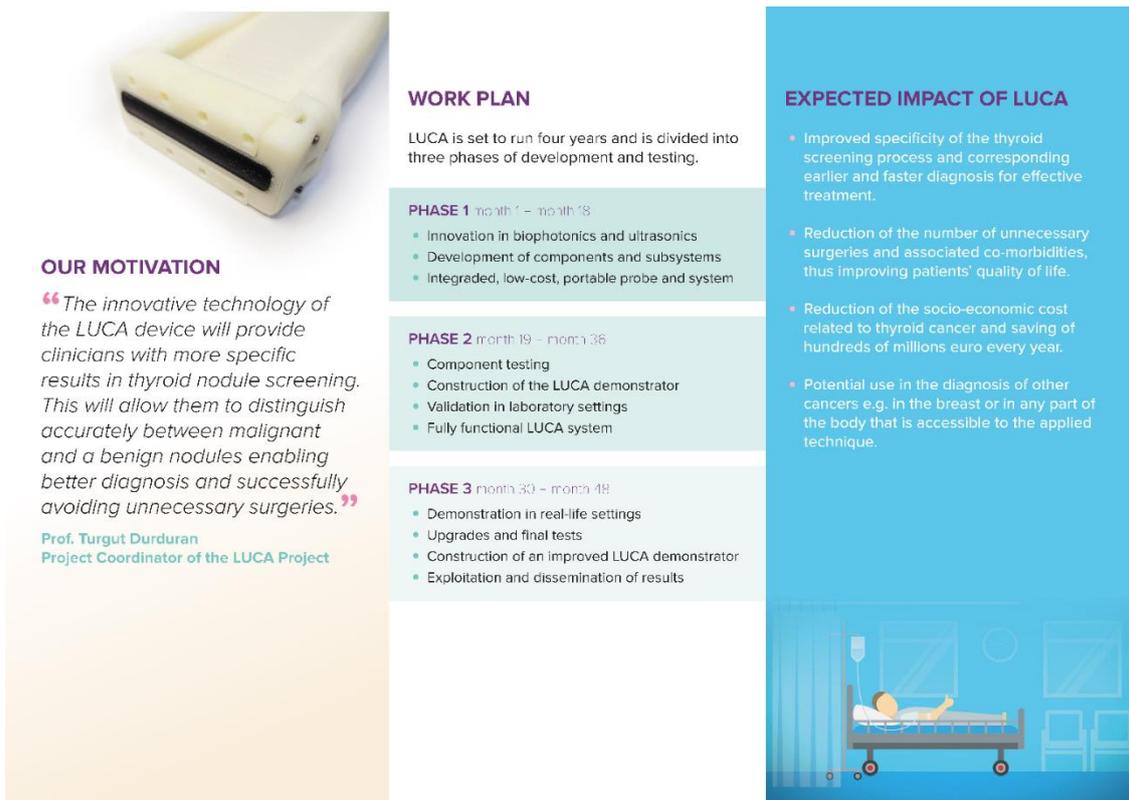


Figure 2: LUCA Flyer rear view

In October 2017, moreover, a roll-up (Fig. 3) was designed for presentation at conferences and trade fairs. LUCA beneficiary ECM so far presented the LUCA roll up at the Medica 2017 and the Arab Health Exhibition 2018.



Laser and Ultrasound Co-Analyzer for Thyroid Nodules

www.luca-project.eu

Developing a novel multimodal device for improved thyroid cancer diagnosis

- Innovation in biophotonics and ultrasonics**
 LUCA is developing an innovative integrated, low-cost, portable device combining ultrasound and near-infrared diffuse optical technologies for multimodal data acquisition.
- Improved diagnosis**
 LUCA will improve the specificity of thyroid screening process and enable earlier and faster diagnosis for effective treatment.
- Clinical usability and socio-economic impact**
 LUCA will reduce the number of unnecessary surgeries and related socio-economic costs. The device can potentially be applied to other types of cancer diagnosis, screening and therapy monitoring.

The project involves eight renowned universities, research organisations and industry partners from five European countries.



Watch the LUCA video

Find out more at www.luca-project.eu

The LUCA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 688303. It is an initiative of the Photonics Public Private Partnership. www.photonics21.org



Figure 3: LUCA Roll-Up

A printable version of the LUCA flyer and roll-up are also available for all consortium partners via the project's online collaboration platform for downloading and printing so that they can also distribute the flyer at their own events. All promotional material includes a link and/or QR code to drive traffic

to the LUCA video and LUCA website, where visitors can find more detailed information about the project.

iii. Newsletter

The first two issues of the LUCA newsletter were sent out in 2017: the first on March 1, 2017 and the second on September 8, 2017. The newsletters are available in electronic (html) and print (pdf) format and were distributed via email (using Mailchimp), social media, and partners' websites as well as at stakeholder events such as the European Congress of Radiology 2017, congress of the European Society for Radiotherapy and Oncology 2017, Medica 2017 and Arab Health 2018. The first issue of the newsletter featured an editorial by the project's coordinator Prof. Turgut Durduran, an interview with Dr. Manuel Puig, member of the LUCA Medical Advisory Board, and three newsflashes covering an overview of the project, the kick-off meeting and the 2nd consortium meeting. The second newsletter edition reported on the 3rd consortium meeting, highlighted the involvement of industry featuring an interview with Sixte de Fraguier from ECM and put a focus on the young researchers in the project.

Both newsletters were sent to the project mailing list with over 250 contacts. The first newsletter was successfully delivered to 95.3% of the recipients with an open rate of 35.1% and a click rate of 2.9% (as of January 4, 2018). The second LUA newsletter reached 98% of subscribers with an open rate of 31% and a click rate of 4.9% (as of January 4, 2018). The open rate is well above and the click rate above or similar to the averages for most industries according to Mailchimp's benchmarking statistics.

Work is currently underway for the third LUCA newsletter providing an overview of year 2 of the project and reporting on the 4th consortium meeting in Birmingham, UK in November 2017. It will be sent out in March 2018.

iv. Other Publications

During the second year of the project, the LUCA partners published/submitted two non-scientific articles and the project was subject of two master theses:

Type of Dissemination and Communication activities	Title and details	Type of audience reached	Estimated number of persons reached
Non-scientific and non-peer reviewed publications (popularised publications)	LUCA featured in article in congress newspaper ECR Today at ECR 2017: "Three EU-funded cancer projects underway with support from EIBIR"	Scientific Community (higher education, research)	1,500
Non-scientific and non-peer reviewed publications (popularised publications)	Article in EIBIR Annual Report 2016	Scientific Community (higher education, research)	250
Other	Master degree thesis defence at PoliMi on Physics Engineering "DEVELOPMENT AND CHARACTERISATION OF A COMPACT MULTI-WAVELENGTH TIME RESOLVED SPECTROSCOPY SYSTEM"	General Public	50



	FOR THYROID CANCER SCREENING” Candidate: Chiara Bonati		
Other	Master degree thesis defence at PoliMi on Electronic Engineering “Eight-wavelengths laser system for time- resolved diffuse optical spectroscopy” Candidate: Federico Leone	General Public	50

b. Website

Throughout project year 2, the [LUCA project website](#) was updated regularly to announce and report on project-related activities, events, and project progress. Google Analytics is used to monitor the traffic. By January 2018, over 2,300 sessions were recorded, of which 75.5% can be attributed to new users. Over the last two years, most sessions were recorded in Spain (over 430) and Italy (over 400). In total, 1,773 users visited the site from over 70 countries around the globe, which shows the international awareness of the project with a strong proportion of visitors also coming from non-EU countries such as the US (11.6%), but also from India (2.0%) and Canada (1.6%).

Most traffic to the website has come via organic search (via search engines such as google), direct visits or via referrals (links from another website, especially from everyphotoncounts.com (website by LUCA beneficiary POLIMI) and eibir.org). The summary below provides an overview of the website activity in year 2 of the project from February 1, 2017 to January 31, 2018:



Figure 4: LUCA Website Traffic Feb 17 - Jan 18

c. Social Media

During year 2, the LUCA partners continued to promote the project on social media via their institutions' accounts. Posts and social media cards were shared on Twitter and LinkedIn. Social media activities related to and during the European Congress of Radiology, the European Conference on Biomedical Optics, on World Cancer Day and on International Thyroid Day were carried out to boost LUCA's visibility during these periods in an effort to engage with stakeholders all over the world. For example, the below social media card was developed for World Cancer Day 2017:



Figure 5: Social Media Card for World Cancer Day 2017

Tweets during ECBO 2017 received between 280 and over 800 impressions. For a tweet about Prof. Turduran's talk at ECR 2017 nearly 1,400 impressions were recorded:



Figure 6: D. Contini, POLIMI, G. Lo Presti, ICFO, and S. Wojtkiewicz, UoB, speaking about LUCA at ECBO 2017 in Munich

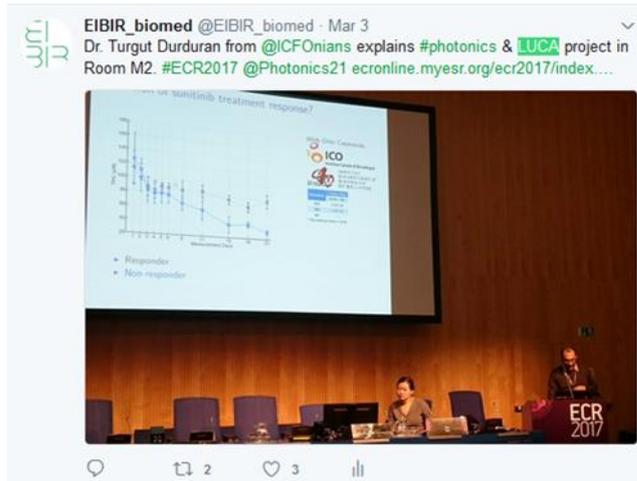


Figure 7: Turgut Durduran, ICFO, presenting LUCA at ECR 2017 in Vienna

Also, meetings of the LUCA consortium are taken as an opportunity for dissemination on social media. Tweets and posts on the 3rd LUCA CGA Meeting in Milan, Italy, in May 2017 received over 2,400 impressions on the EIBIR Twitter account and over 300 views on LinkedIn.



Figure 8: Twitter (l) and LinkedIn (r) posts on occasion of the 3rd CGA Meeting in Milan, IT, May 2017

d. Events
i. Presentations

Throughout year 2, the LUCA project was again presented and promoted by consortium partners in scientific talks on several occasions. The table below provides an overview:

Type of Dissemination and Communication activities	Title and details	Type of audience reached	Estimated number of persons reached

Participation to a conference	D. Contini: presentation on “A compact dual wavelengths time-domain fNIRS system” during PHOTONIC WEST 2017, San Francisco, California USA, January/February 2017.	Scientific Community (higher education, research)	200
Participation to a conference	T. Durduran: presentation on “Multi-modal imaging with diffuse optics for cancer theranostics” during EIBIR Session on “EU Research on cancer imaging” at ECR March 2017	Scientific Community (higher education, research)	200
Participation to a conference	M. Renna: “Compact dual wavelength system for time resolved diffuse optical spectroscopy” at the IEEE PRIME June 2017	Scientific Community (higher education, research)	20-50
Participation to a conference	D. Contini: “A Compact Time-Domain NIRS System,” at the European Conferences on Biomedical Optics June 2017	Scientific Community (higher education, research)	150
Participation to a conference	L. Cortese et al.: “Phantoms for Time-Resolved Spectroscopy and Diffuse Correlation Spectroscopy with Tunable Optical and Dynamic Properties” at the European Conferences on Biomedical Optics June 2017	Scientific Community (higher education, research)	150
Participation to a conference	S. Konugolu Venkata Sekar: “Thyroid tissue Constituents Characterization and Application to in vivo studies by Broadband (600-1200 nm) Diffuse Optical Spectroscopy.,” at the European Conferences on Biomedical Optics June 2017	Scientific Community (higher education, research)	150
Participation to a conference	G. Lo Presti et al.: “The overview and current status of the LUCA project - Laser and Ultrasound Co-analyzer for Thyroid Nodules” at the European Conferences on Biomedical Optics June 2017	Scientific Community (higher education, research)	150
Participation to a conference	S. Wojtkiewicz et al “Ultrasound Guided Diffuse Optical Characterization of Human Thyroid Tissue” at the European Conferences on Biomedical Optics June 2017	Scientific Community (higher education, research)	150

ii. Promotional Activities

In addition to scientific presentations, the LUCA project was also introduced and presented at conferences, meetings and trade fairs with promotional material to build awareness of the project among end-users, researchers and industry representatives.

Type of Dissemination and Communication activities	Title and details	Type of audience reached	Estimated number of persons reached
Flyers	LUCA Folder and Newsletter for distribution at EIBIR Booth at ECR 2017	Scientific Community (higher education, research)	200
Non-scientific and non-peer reviewed publications (popularised publications)	LUCA featured in article in congress newspaper ECR Today at ECR 2017: “Three EU-funded cancer projects underway with support from EIBIR”	Scientific Community (higher education, research)	1,500
Non-scientific and non-peer reviewed publications (popularised publications)	Article in EIBIR Annual Report 2016	Scientific Community (higher education, research)	250
Flyers	LUCA Flyer distributed at European Society for Radiotherapy and Oncology in Vienna, Austria, May 5-9, 2017.	Scientific Community (higher education, research)	50

Flyers	LUCA Flyer distributed at the ESOI Summer Workshop on "Imaging of head and neck cancer" in Pisa, Italy, 14-15 September 2017. http://esoi-society.org/index.php?pid=19&lang=1	Scientific Community (higher education, research)	25
Flyers	LUCA Flyer distributed at the ESHNR Annual Scientific Meeting in Lisbon, Portugal, 28-30 September 2017.	Scientific Community (higher education, research)	40
Flyers	LUCA roll-up and dissemination material distributed at MEDICA 2017, 13-16 November 2017	Industry	30
Flyers	LUCA roll-up and dissemination material distributed at Arab Health Exhibition and Congress 2018, 29 January - 1 February 2018	Industry	30

e. Collaboration Activities

In October 2017, LUCA was selected to participate in the European Commission's pilot program "Common Dissemination Booster" to boost LUCA's dissemination capabilities and outreach. For this initiative LUCA has joined forces with two other projects, SOLUS (Smart optical and ultrasound diagnostics of breast cancer, led by LUCA partner POLIMI), and PAMMOTH (Photoacoustic/Ultrasound Mammoscopy for evaluating screening-detected abnormalities in the breast, led by the University of Twente). All three projects in the cluster combine ultrasound and photonics to improve screening and diagnostics and therefore there is a significant overlap in theme, stakeholders and end-users. EIBIR worked together with the PIs of the three projects to submit an application to the program and draft and abstract outlining the common denominators of the projects and the application under the lead of LUCA was accepted on October 30. EIBIR and ICFO will attend the trainings and lead the collaboration with the SOLUS and PAMMOTH projects on behalf of LUCA.

The abstract submitted is copied below:

The paradigm in diagnosis of cancer is to establish whether a lesion is benign or malignant. Imaging techniques conventionally used today have many limitations, leading to inconclusive results and multiple and/or repeat imaging, followed by often unnecessary biopsies. This leads to physical, psychological and economic burdens at individual and societal levels.

*The three projects **LUCA, PAMMOTH and SOLUS** all aim to develop innovative devices combining ultrasonography technologies and photonics, as well as image reconstruction algorithms, for a multi-parametric characterization of thyroid and breast cancer. These technologies will also be validated in a clinical setting.*

The CDB Project Group includes partners from academia and industry (8 SMEs) to ensure that project results will be successfully introduced to the market.

*Results are **relevant to a broad end-user community** of clinicians (radiologists, oncologists, surgeons), cancer researchers, diagnostic and medical device industry, health authorities and policy makers, CROs, as well as patients and their families. Our innovative developments in photonic instrumentation could potentially be of interest in other (non-)medical fields as well.*

The CDB Project Group will disseminate results about the development of new photonics components, new software solutions for image reconstruction and quantification, and initial clinical performance of the devices. The project partners are convinced that their results will significantly contribute to a more

accurate and rapid diagnosis without performing unnecessary biopsies or the use of contrast agents, increasing patient's quality of life, while being cost-effective and easy to use.

Moreover, LUCA submitted an application to the VERTIGO project (vertigo.starts.eu), which would allow the consortium to host an Artistic Residency to boost LUCA's innovation process and the dissemination. The VERTIGO project is a Coordination and Support Action supported by H2020, which promotes the arts for a creative conversion of science and technology knowledge into new products, services, and processes and funds artist residencies in R&D projects. The artist would contribute to the innovative aspects of the research within LUCA by bringing a creative perspective through artistic practices. These practices should lead to an original artwork based on the project's technology featuring novel use-cases with a high potential for innovation. After consultation with the partners during the 4th CGA Meeting in Birmingham, UK in November/December 2017, ICFO submitted an application to the VERTIGO project on behalf of LUCA.

3) Planned Activities for Year 3

In year 3 of the project, the WP6 partners will continue to develop and enhance the project's communication kit and make updates to the dissemination and communication plan as necessary. The partners will maintain and update the website as project results become available for dissemination. The consortium will continue to promote the scientific activities of the project and their results on the project website and via social media channels.

Key dissemination activities identified for the third year (M25-M36) include:

- Maintaining the project's stakeholder database
- Maintaining the LUCA online presence (project website, social media)
- Developing and updating promotional material with general project information
- Distributing a press release by the project and by consortium partners (M36)
- Distributing information to external websites (e.g. project partner websites, and those of associates), but also to traditional print media
- Representing LUCA at events such as national or international scientific meetings or congresses, but also patient information conferences and trade fairs (see below)
- Increasing outreach through collaborative activities with other projects through the Common Dissemination Booster initiative
- Preparing an updated LUCA video

Activities already scheduled for year 3 include:

Type of Dissemination and Communication activities	Title and details	Type of audience reached	Estimated number of persons reached
Participation to a conference	Udo Weigel: presentation on "Laser and Ultrasound Co-analyser for Thyroid Nodules (LUCA) Project: latest results" during EIBIR Session "European imaging researchers united in diversity" at ECR 2018	Scientific Community (higher education, research)	200
Participation to a conference	LUCA dissemination material for distribution at EIBIR Booth at ECR 2018	Scientific Community (higher education, research)	200
Participation to a conference	A. Dalla Mora: invited presentation on "Novel Technologies for Time-Domain	Scientific Community (higher education, research)	200

	Diffuse Optics: Miniaturized Wearable Devices and Bioresorbable Optical Fibers” OSA Topical Meeting on Biomedical Optics		
Participation to a workshop	D. Contini: invited presentation on “Time domain Near Infrared Spectroscopy” during International SPAD Sensor Workshop (ISSW) February 2018	Scientific Community (higher education, research)	100
Non-scientific and non-peer reviewed publications (popularised publications)	LUCA featured in article in congress newspaper ECR Today at ECR 2018	Scientific Community (higher education, research)	1,500
Non-scientific and non-peer reviewed publications (popularised publications)	Article in EIBIR Annual Report 2017	Scientific Community (higher education, research)	250
Press release	Presentation of fully functional LUCA system	Medias	50,000
Video/Film	LUCA – How does the technique work	Customers	500
Video/Film	LUCA – How does the technique work	General Public	10,000
Training	Include LUCA in the program content for visitors that come to ICFO	Other	1,000

4) Conclusion

Throughout the second year of the LUCA project, the partners actively engaged in the dissemination of general information on and results of the project and already scheduled several activities for year 3. By the end of year 2, LUCA has become a well-known project in the biomedical optics community and has been introduced to the medical and clinical communities. It is expected that LUCA’s participation in the Common Dissemination Booster initiative and collaboration with other projects will further increase the project’s outreach.