DELIVERABLE 5.5

Title: D5.5 Communication kit (mid-term)

PROJECT INFO	
Call/Topic	ICT-36-2020 Disruptive photonics technologies
Project title	COHERENT RAMAN IMAGING FOR THE MOLECULAR STUDY OF THE ORIGIN OF DISEASES
Project acronym	CRIMSON
Grant Agreement No.	101016923
Project website	http://crimson-project.eu/

DELIVERABLE INFO	
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Deliverable title	Communication kit (mid-term)
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Lead Beneficiary	POLIMI
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Reviewers	All partners
Dissemination level	Public
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Actual delivery date	31/05/2022 (M18)
Version	1.0

History of changes

Version	Date	Comments	Main Authors
0.1	20/05/2022	First draft	Fabrizio Amarilli (POLIMI/FPM)
0.2	23/05/2022	Revision and extension	Dario Polli (POLIM), Fabrizio Amarilli (POLIMI/FPM)
0.3	30/05/2022	Contribution on communication by partners	All partners
0.4	31/05/2022	Revision by coordinator	Dario Polli (POLIMI)
1.0	31/05/2022	Final editing	Stefano Sanna, Fabrizio Amarilli (POLIMI-FPM)

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016923.

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EXECUTIVE SUMMARY

Communication in the CRIMSON project aims at raising awareness on the project and on its scientific results in order to reach several communities of interest and maximise the exploitation potential. A communication strategy, comprising the key messages to communicate to the preliminary communication kit was released as D5.4 at the beginning M3 of the project. D5.5 represents an updated version of the communication kit, released at the end of the first reporting perdiod (M18). The present deliverable provides information on the communication tools that were prepared to support the communication of the CRIMSON project as well as the communication activities realised during the first 18 months of work. Communication tools comprise templates for deliverables and documentation of the project, templates for presentations, graphical elements (visual identity) necessary for guaranteeing homogeneous communication. The key communication messages to share in communication activities and the key principles guiding communication have been defined. A repository of the communication material was prepared and shared with the EU Commission and Photonics21. The repository contains: the project press releases in four languages, the project video, a PowerPoint presentation of the project, additional communication material (e.g. photos made available by project partners). All communication material is free of copyright, or the authors authorise the EU Commission and Photonics21 to exploit the material for communication and not-commercial purposes.

1 Communication strategy

1.1 Overview

The goal of the CRIMSON project is to contribute to a breakthrough in microscopy and endoscopy in the study of the cellular origin of diseases, advancing the field of precision medicine. CRIMSON is a trans-disciplinary and trans-national research project involving ten partners from four different countries and coordinated by the Politecnico di Milano University. The project will develop the next-generation bio-photonics imaging device for biomedical research, combining advanced laser techniques with artificial intelligence data analysis. This ground-breaking microscope will provide three-dimensional quantitative maps of sub-cellular compartments in living cells and organoids and enable fast tissue classification with unprecedented biomolecular sensitivity. High acquisition speed will allow the observation of intra- and inter-cellular dynamic changes by time-lapse imaging.

1.2 Key communication messages

The Communication activity of the CRIMSON project serves two major objectives: (i) creating awareness and consensus among the project partners on the need to communicate effectively the research project, the opportunity made available through the Horizon2020 funding, and the project results among the general public and to different non-scientific stakeholders, and (ii) sharing a communication strategy among the partners and providing a set of tools that can be used in different communication opportunities, in order to harmonise communication activities.

Communication of the CRIMSON project and of its results will contribute to social, scientific, and business results. By allowing for a more complex analysis of biological specimens in one experimental step and using a single instrument, CRIMSON technology will contribute to an improved understanding of diseases. The design of novel personalised treatment, enabled by the technologies tested in the project, will play a role in improving the health of the European population in the long term. From an economic perspective, furthering the technologies for optimised microscopy and endoscopy platforms, combining laser and detection systems, is likely to open up new markets for the European photonic industry as well as creating room for new services, such as those enabled by the advanced AI analysis tools. The partners of the project, and the SMEs in particular, are keen to commercially exploit this market opportunity.

Deliverable D5.5 Communication kit (mid-term) delivered at M18 represents an updated version of the preliminary communication kit delivered as D5.4 at the beginning of the project (M3). As foreseen in the proposal, communication is an ongoing process, and its communication tools and activities are regularly updated throughout the execution of the project.

1.3 Communication principles

The communication activities of the CRIMSON project are inspired and shaped by some high-level communication principles.

- Building a project identity through a toolkit that was created at the beginning of the project and that will enable a harmonised communication action.
- Development of "simple, but not simplified" communication. Partners are already familiar with Horizon-2020 projects communication, but during kick-off and coordination meetings they shared the need of reaching a wide public of non-experts using clear, scientifically sound, and attractive messages. The goal is to highlight the novelty of the project and the possible implications for research and for society.
- Exploitation of media for communication through different channels such as the Website, communication videos and presentations.
- Engagement of all partners for successful communication.
- Acknowledge of the contribution and support from the European Commission and from the Photonics Public Private Partnership Photonics21.

1.4 Repository for communication material

A repository of the communication material was prepared and shared with the EU Commission and Photonics21. The repository contains:

- The project press releases in four languages;
- The project video;
- A PowerPoint presentation of the project;
- Additional communication material (e.g. photos made available by project partners).

All communication material is free of copyright or the authors authorise the EU Commission and Photonics21 to exploit the material for communication and not-commercial purposes. The repository is available at: https://www.dropbox.com/sh/e48li622ivnxzsy/AABGJ3uauXC0LWbPAiq604zTa?dl=0

2 Communication tools

2.1 Visual identity pack and logo

The visual identity pack for the project was prepared at M1 and contains the project logo with coordinated headed paper, poster, PowerPoint and leaflet templates.

The following logo in two versions was designed.

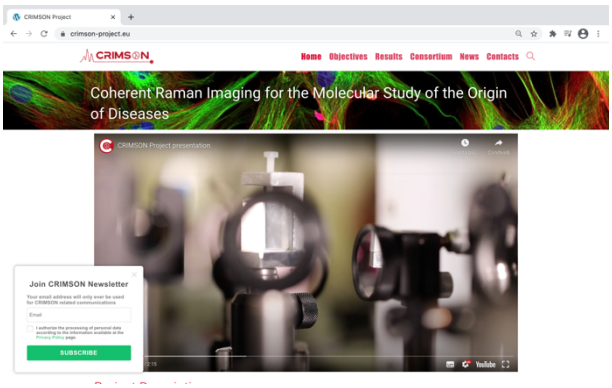
The graphical elements of the logo recall some key components of the research carried out in CRIMSON: the Raman spectrum, the laser technology, and the cell.

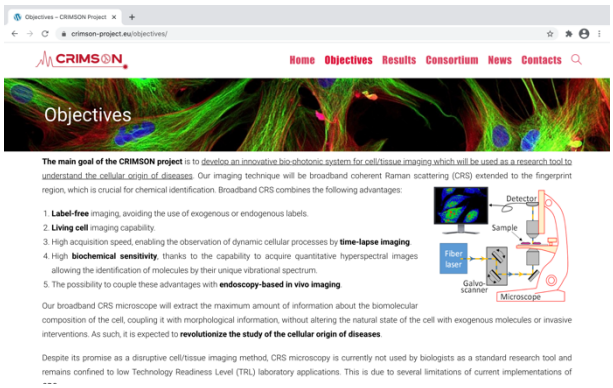
The design and selection process for the logo foresaw the sharing among the project partners of different proposals and few iterations of suggestions and revisions.

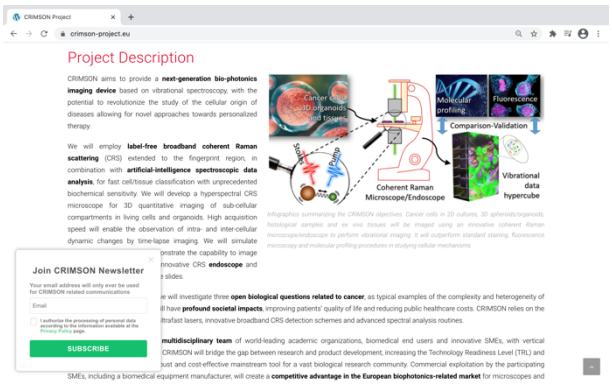
2.2 Project website and social media

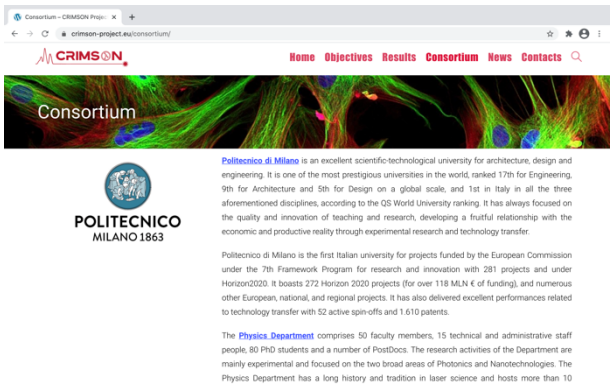
The project website represents the central hub for the communication of the project. The website of the CRIMSON project can be reached at: www.crimson-project.eu.

The design of the website reflects the key elements in the organisation of a Horizon2020 project and informs on project objectives, expected results, partners of the consortium and their role. We provide below some of the information pages of the website.

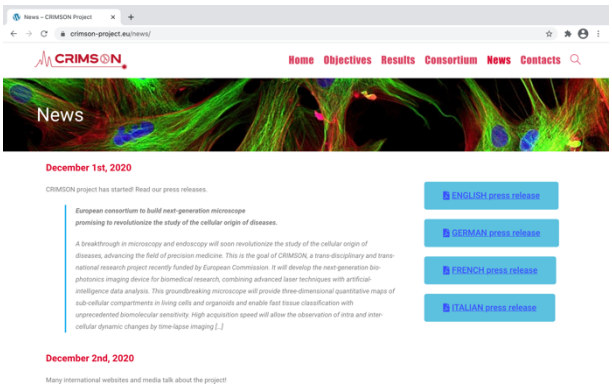


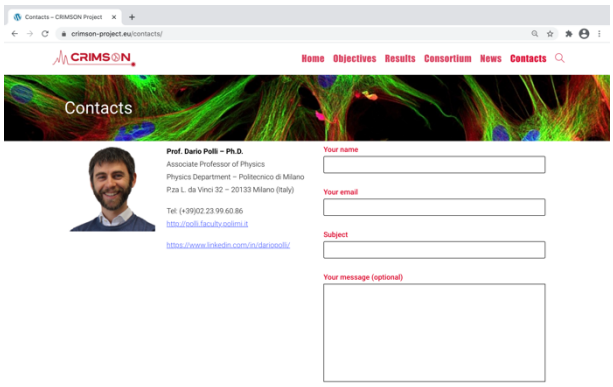






In addition to presenting the project, the website also offers to the visitors some tools to be in contact with the project and be updated on the project activities through the registration to the CRIMSON newsletter and a "contact" section.





In addition to the project website, a Twitter account (see https://twitter.com/CrimsonEu) and a LinkedIn account (https://www.linkedin.com/company/crimson-project/) dedicated to CRIMSON have been created (see screenshots below) to share up-to-date information on the project and on connected activities and events.

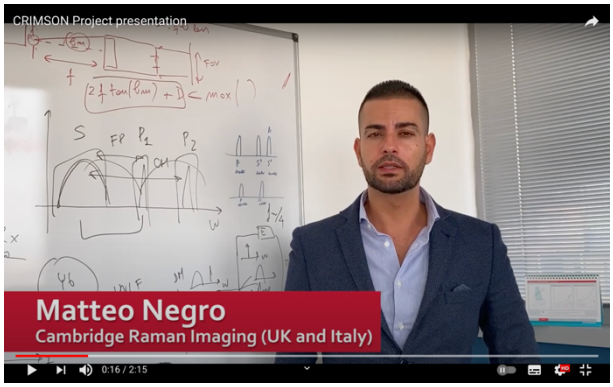
2.3 Communication video

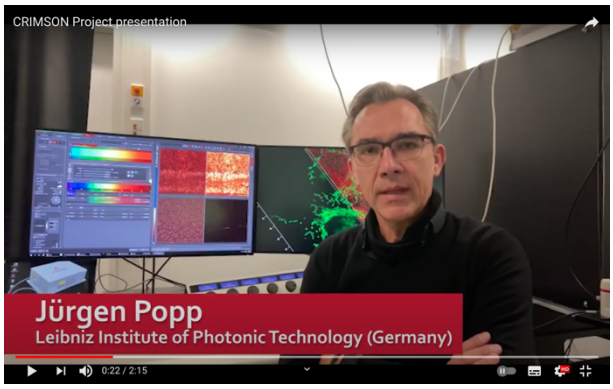
In order to draw the attention of the general public in a straightforward form, a video recalling project objectives and activities was implemented. The video design followed some general guidelines:

- Provide an immediate view on the aim and ambition of the project.
- Underline the results and benefits for society that the project will generate through the advances in precision medicine.
- Highlight the benefits of a research-industry collaboration in delivering new technology that have the potential to become widely adopted.

The video is accessible through the project website and from Youtube: https://www.youtube.com/watch?v=NEtjOCjNe2s&feature=emb_logo

We provide below some screenshots from the video.




CRIMSON Project presentation
Jürgen Popp
Leibniz Institute of Photonic Technology (Germany)

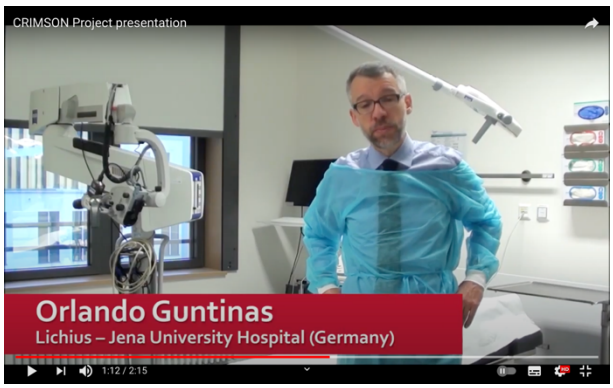

CRIMSON Project presentation
Tobias Meyer
Leibniz Institute of Photonic Technology (Germany)


CRIMSON Project presentation
Hervé Rigneault
Institut Fresnel (France)

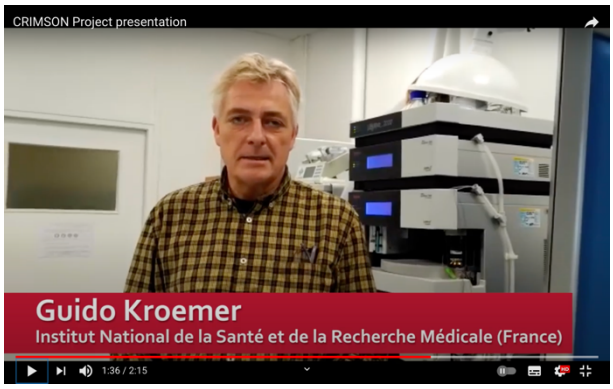

CRIMSON Project presentation
Tino Eidam
Active Fiber Systems (Germany)

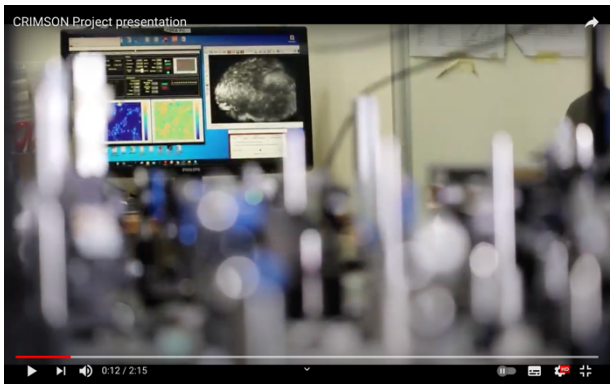

CRIMSON Project presentation
Victor Tsvirkun
Lightcore Technologies (France)


CRIMSON Project presentation
3rdPlace
user & customer AI
Matteo Bregonzio
3rd Place (Italy)


CRIMSON Project presentation
Orlando Guntinas
Lichius – Jena University Hospital (Germany)


CRIMSON Project presentation
Italia Bongarzone
Istituto Nazionale dei Tumori (Italy)





The video has been created through a collaborative effort of all partners. The video was capable of collecting relevant attention (see D6.2 section 1.2.5 WP5 Communication, Dissemination, Innovation and Exploitation). It has to be noted that the publication of the video was performed in two steps. The initial video was replaced by an updated version (to incorporate some editing improvements). This forced the restarting of the counting of the Youtube views.

In parallel to the English version of the project video, an introductory video in the Italian language was also prepared by the coordinator for local use. The video is available at https://www.youtube.com/watch?v=QyNOeEU-Jz8. The video recalls the key objectives of research, the scientific challenges and novelty of the project, the key expected results, and the benefits for the end users, for the market, and for the society.

2.4 Press kit

In order to coordinate activities and promote homogeneous communication, a press release was prepared and delivered in correspondence to the launch of the project. The press release is included as an annex to this deliverable. The press release was prepared in four languages (English, German, French, Italian).

European consortium to build next-generation microscope promising to revolutionize the study of the cellular origin of diseases.

A breakthrough in microscopy and endoscopy will soon revolutionize the study of the cellular origin of diseases, advancing the field of precision medicine. This is the goal of CRIMSON, a trans-disciplinary and trans-national research project recently funded by European Commission. It will develop the next-generation bio-photonics imaging device for biomedical research, combining advanced laser techniques with artificial-intelligence data analysis. This groundbreaking microscope will provide three-dimensional quantitative maps of sub-cellular compartments in living cells and organoids and enable fast tissue classification with unprecedented biomolecular sensitivity. High acquisition speed will allow the observation of intra and inter-cellular dynamic changes by time-lapse imaging.

The CRIMSON project, starting 1 December 2020, lasting 42 months and with a budget exceeding 5M€, will also simulate future in-vivo studies and demonstrate the capability to image inside the body, realizing an innovative endoscope and applying it to ex-vivo thick tissue samples. The results have potentially profound societal impacts, improving patients' quality of life and reducing public healthcare costs.

A multidisciplinary team of world-leading organizations with vertical integration of all required skills composes the consortium, coordinated by Politecnico di Milano (Italy). Three research centers (Politecnico di Milano - Italy, Leibniz Institute of Photonic Technology e.V - Germany and Centre National de la Recherche Scientifique - France), with long-standing expertise in photonics, spectroscopy and nonlinear microscopy, will develop the technology. Three biomedical partners (Istituto Nazionale Tumori - Italy, Institut National de la Santé et de la Recherche Médicale - France and Jena University Hospital - Germany) will validate the imaging system on open biological questions related to cancer, as typical examples of the complexity and heterogeneity of cellular diseases.

Four innovative SMEs (Active Fibre Systems GmbH - Germany, Lightcore Technologies - France, Cambridge Raman Imaging Limited - UK and 3rdPlace S.r.l. - Italy), including a biomedical equipment manufacturer, will commercially exploit the innovation, thus creating a competitive advantage in the European biophotonics-related market for microscopes and R&D tools.

More info on www.crimson-project.eu
Video: https://www.youtube.com/watch?v=NEtjOCjNe2s

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Europäisches Forschungsteam will mit neuartigem Mikroskop den zellulären Ursprüngen von Krankheiten auf die Spur kommen

Mit einem neuartigen Ansatz in Mikroskopie und Endoskopie will ein europäisches Forschungsteam den zellulären Ursprüngen von Krankheiten auf die Spur kommen und die Präzisionsmedizin entscheidend voranbringen. Mit diesem Ziel startet zum 1. Dezember 2020 das länderübergreifende transdisziplinäre Forschungsprojekt CRIMSON. Forschende aus Italien, Deutschland und Großbritannien entwickeln ein biophotonisches Bildgebungsgerät der nächsten Generation für die biomedizinische Forschung. Es kombiniert fortschrittliche Lasertechniken mit Datenanalyse durch künstliche Intelligenz. Die Europäische Kommission fördert das Projekt über 42 Monate mit mehr als 5 Millionen Euro.

Das bahnbrechende Mikroskop wird dreidimensionale quantitative Bilder von subzellulären Kompartimenten in lebenden Zellen und Organoiden liefern und eine schnelle Gewebeklassifizierung mit beispielloser biomolekularer Empfindlichkeit ermöglichen. Die hohe Aufnahmegeschwindigkeit erlaubt die Beobachtung intra- und interzellulärer dynamischer Veränderungen mit hohen Bildwiederholraten. Die Forschungsteams entwickeln ein innovatives Endoskop für die Bildgebung im Körperinneren. Um künftige In-vivo-Studien zu simulieren, kommt es zunächst für die Untersuchung dicker Gewebeproben ex vivo zum Einsatz.

Ein multidisziplinäres Team aus international führenden Forschungseinrichtungen und Unternehmen stellt das Konsortium des Projekts, das vom Politecnico di Milano koordiniert wird. Drei Forschungszentren mit langjähriger Expertise in Photonik, Spektroskopie und nichtlinearer Mikroskopie werden die Technologie entwickeln: das Politecnico di Milano (Italien), das Leibniz-Institut für Photonische Technologien e.V. (Deutschland) und das Centre National de la Recherche Scientifique (Frankreich). Biomedizinische Partner sind das Instituto Nazionale Tumori (Italien), das Institut National de la Santé et de la Recherche Médicale (Frankreich) und das Universitätsklinikum Jena (Deutschland). Sie werden das Bildgebungssystem mit Blick auf offene biologische Fragen in der Erforschung von Krebserkrankungen validieren. Diese sind paradigmatisch für die Komplexität und Heterogenität von Zellkrankheiten. Vier innovative KMU (Active Fibre Systems GmbH, Deutschland; Lightcore Technologies, Frankreich; Cambridge Raman Imaging Limited, Großbritannien; 3rdPlace S.r.l., Italien), darunter ein Hersteller biomedizinischer Geräte, werden die Innovation kommerziell verwerten. Damit schaffen sie einen Wettbewerbsvorteil auf dem europäischen Markt für Mikroskope und F&E-Werkzeuge im Bereich der Biophotonik.

Die Ergebnisse haben das Potential, die Lebensqualität von Patientinnen und Patienten zu verbessern und Kosten im öffentlichen Gesundheitswesen zu senken.

Weitere Informationen unter www.crimson-project.eu
Video : https://www.youtube.com/watch?v=NEtjOCjNe2s

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Un consortium européen va construire un microscope de nouvelle génération promettant de révolutionner l'étude de l'origine cellulaire des maladies.

Une percée en microscopie et en endoscopie va bientôt révolutionner l'étude de l'origine cellulaire des maladies, faisant ainsi progresser le domaine de la médecine de précision. C'est l'objectif de CRIMSON, un projet de recherche transdisciplinaire et transrationnel récemment financé par la Commission européenne. Il développera la prochaine génération d'appareils d'imagerie bio-photonique pour la recherche biomédicale, en combinant des techniques laser avancées avec l'analyse de données par intelligence artificielle. Ce microscope révolutionnaire fournira des cartes quantitatives tridimensionnelles des compartiments sous-cellulaires des cellules vivantes et des organoïdes et permettra une classification rapide des tissus avec une sensibilité biomoléculaire sans précédent. La vitesse d'acquisition élevée permettra d'observer les changements dynamiques intra et intercellulaires par imagerie en temps réel.

Le projet CRIMSON, qui débutera le 1er décembre 2020, durera 42 mois et disposera d'un budget supérieur à 5 millions d'euros. Il permettra également de simuler de futures études in vivo et de démontrer la capacité d'imagerie à l'intérieur du corps humain, en réalisant un endoscope innovant et en l'appliquant à des échantillons de tissus épais ex vivo. Les résultats attendus ont potentiellement de profondes répercussions sociétales, améliorant la qualité de vie des patients et réduisant les coûts des soins de santé publics.

Le consortium, coordonné par le Politecnico di Milano (Italie), est composé d'une équipe multidisciplinaire d'organisations de premier plan au niveau mondial, avec une intégration verticale de toutes les compétences requises. Trois centres de recherche (Politecnico di Milano - Italie, Leibniz Institute of Photonic Technology e.V - Allemagne et Centre National de la Recherche Scientifique - France), avec une expertise de longue date en photonique, spectroscopie et microscopie non linéaire, développeront la technologie. Trois partenaires biomédicaux (Istituto Nazionale Tumori - Italie, Institut National de la Santé et de la Recherche Médicale - France et Hôpital universitaire d'Iéna - Allemagne) valideront le système d'imagerie sur des questions biologiques ouvertes liées au cancer, en tant qu'exemples de la complexité et de l'hétérogénéité des maladies cellulaires.

Quatre PME innovantes (Active Fibre Systems GmbH - Allemagne, Lightcore Technologies - France, Cambridge Raman Imaging Limited - Royaume-Uni et 3rdPlace S.r.l. - Italie), dont un fabricant d'équipements biomédicaux, exploiteront commercialement l'innovation, créant ainsi un avantage concurrentiel sur le marché européen des microscopes et des outils de R&D liés à la biophotonique.

Plus d'informations sur www.crimson-project.eu
Video : https://www.youtube.com/watch?v=NEtjOCjNe2s

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Microscopi di nuova generazione promettendo di rivoluzionare lo studio dell'origine cellulare delle malattie

Una svolta nella microscopia e nell'endoscopia rivoluzionerà presto lo studio dell'origine cellulare delle malattie, avanzando nel campo della medicina di precisione. Questo è l'obiettivo di CRIMSON, un progetto di ricerca transdisciplinare e transnazionale recentemente finanziato dalla Commissione Europea. Svilupperà un dispositivo di imaging biofotonico di prossima generazione per la ricerca biomedica, combinando tecniche laser avanzate con sofisticate analisi dati basate su algoritmi di intelligenza artificiale. Questo innovativo microscopio fornirà mappe tridimensionali quantitative di compartimenti subcellulari in cellule viventi e organoidi e consentirà una rapida classificazione dei tessuti con una sensibilità biomolecolare senza precedenti. L'elevata velocità di acquisizione consentirà di creare filmati in tempo reale sia dei processi intracelulari che delle dinamiche tra le varie cellule dei tessuti.

Il progetto CRIMSON, della durata di 42 mesi a partire dal 1 dicembre 2020 e con un budget superiore a 5M €, simulerà anche futuri studi in-vivo all'interno del corpo umano, realizzando un endoscopio innovativo e applicandolo alla diagnostica per immagini su campioni di tessuto. I risultati avranno un impatto sociale potenzialmente dirompente, in quanto sul lungo termine contribuiranno a migliorare la qualità della vita dei pazienti e a ridurre i costi dell'assistenza sanitaria pubblica.

Il consorzio, coordinato dal Politecnico di Milano, è composto da un team multidisciplinare di organizzazioni leader a livello mondiale, con integrazione verticale di tutte le competenze richieste. La tecnologia verrà sviluppata da tre centri di ricerca con esperienza di lunga data in fotonica, spettroscopia e microscopia non lineare: Politecnico di Milano (Italia), Leibniz Institute of Photonic Technology e.V (Germania) e Centre National de la Recherche Scientifique (Francia). Il sistema di imaging verrà poi convalidato su attuali questioni biologiche di grande interesse relative al cancro, come esempi paradigmatici della complessità ed eterogeneità delle malattie cellulari, grazie al contributo dell'Istituto Nazionale dei Tumori (Italia), dell'Institut National de la Santé et de la Recherche Médicale (Francia) e dello Jena University Hospital (Germania).

Quattro PMI innovative (Active Fiber Systems GmbH - Germania, Lightcore Technologies - Francia, Cambridge Raman Imaging Limited - Regno Unito e 3rdPlace Srl - Italia), tra cui un produttore di apparecchiature biomedicali, sfrutteranno commercialmente l'innovazione, creando così un vantaggio competitivo nel mercato europeo della biofotonica, della microscopia e degli strumenti di ricerca e sviluppo.

Maggiori informazioni su www.crimson-project.eu
Video : https://www.youtube.com/watch?v=NEtjOCjNe2s

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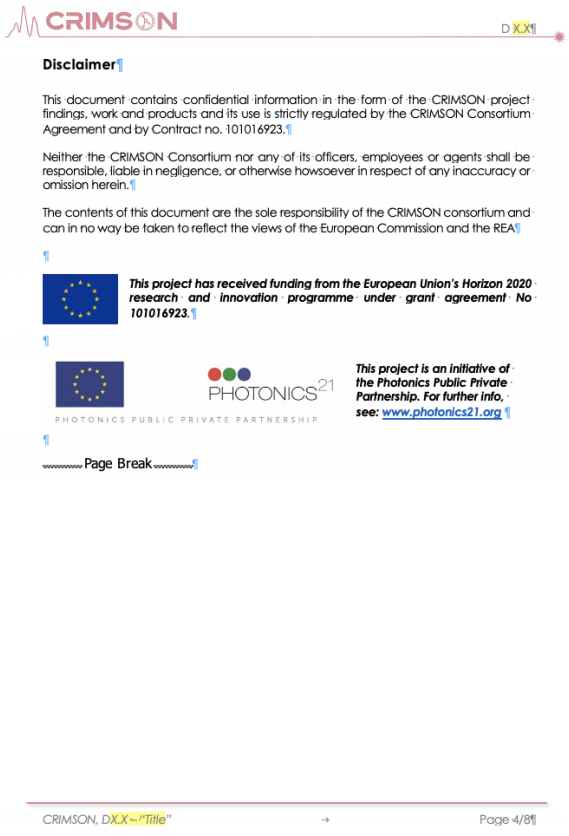
2.5 Templates for deliverables and presentations

Based on the project logo, templates for PowerPoint presentations and Word documents, in particular for deliverables, were released at the beginning of the project. This facilitated production of standard documents from the very beginning of project activities.

Title: "xxx xxx xxx"¶

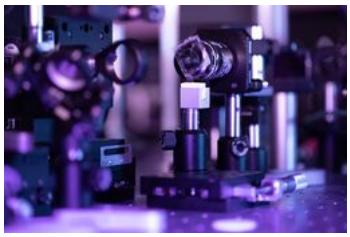
¶ Section Break (Continuous)

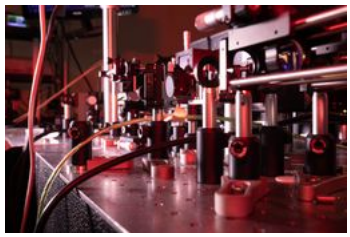
Page Break¶

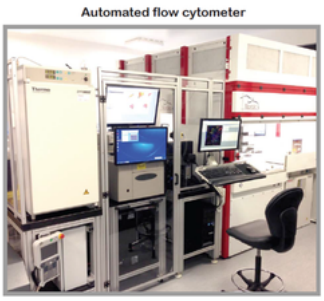


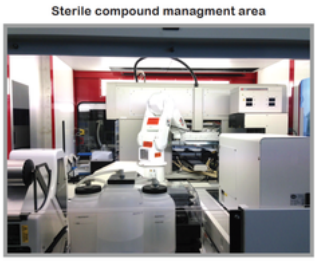
2.6 Repository of images to support communication

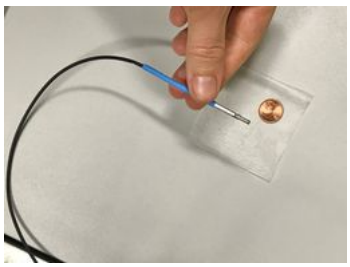
A repository of images collected from the project partners was created and shared among partners. The archive gathers images of different technological components relevant for the project as well as pictures of the facilities and laboratories. This repository was exploited during the production of the project video and will help partners communicate project activities on different channels. A sample of the shared images is displayed below.

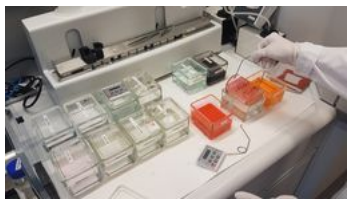


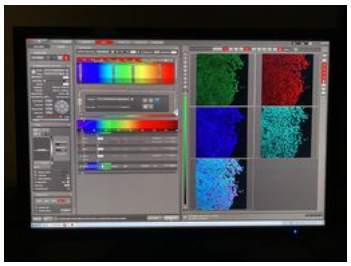


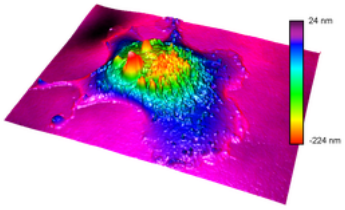


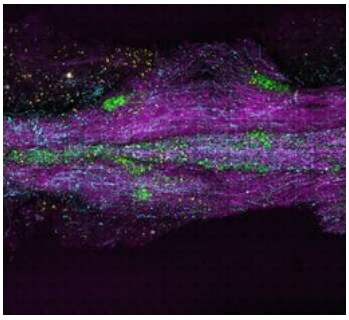


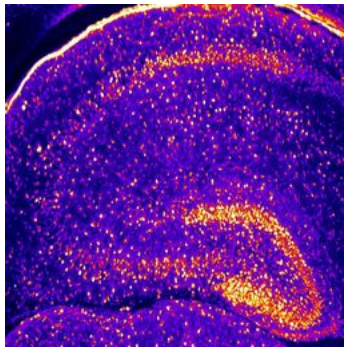










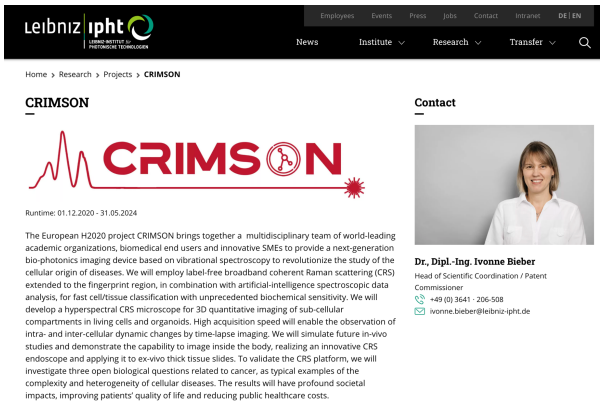


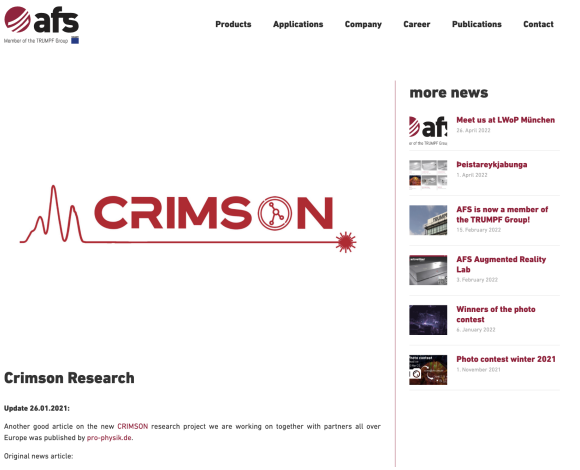
3 Initial communication activities

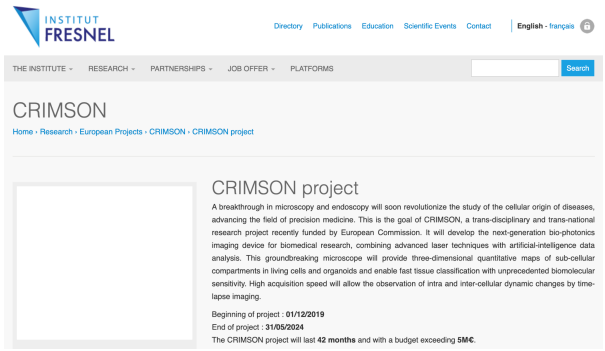
Several communication activities have been undertaken during the first 18 months of activity of the project, comprising sharing of videos dedicated to the project on YouTube, communication through partners' institutional websites, and communication on social media (Twitter and LinkedIn) and on different media (e.g. local radio channel, national innovation platforms). Results of the activities and, in particular, quantitative indicators compared to the KPIs proposed in the DoA are provided in deliverable D6.2 (see section "1.3 - Impact" of D6.2).

3.1 Activities performed by the partners through institutional websites and institutional social media accounts

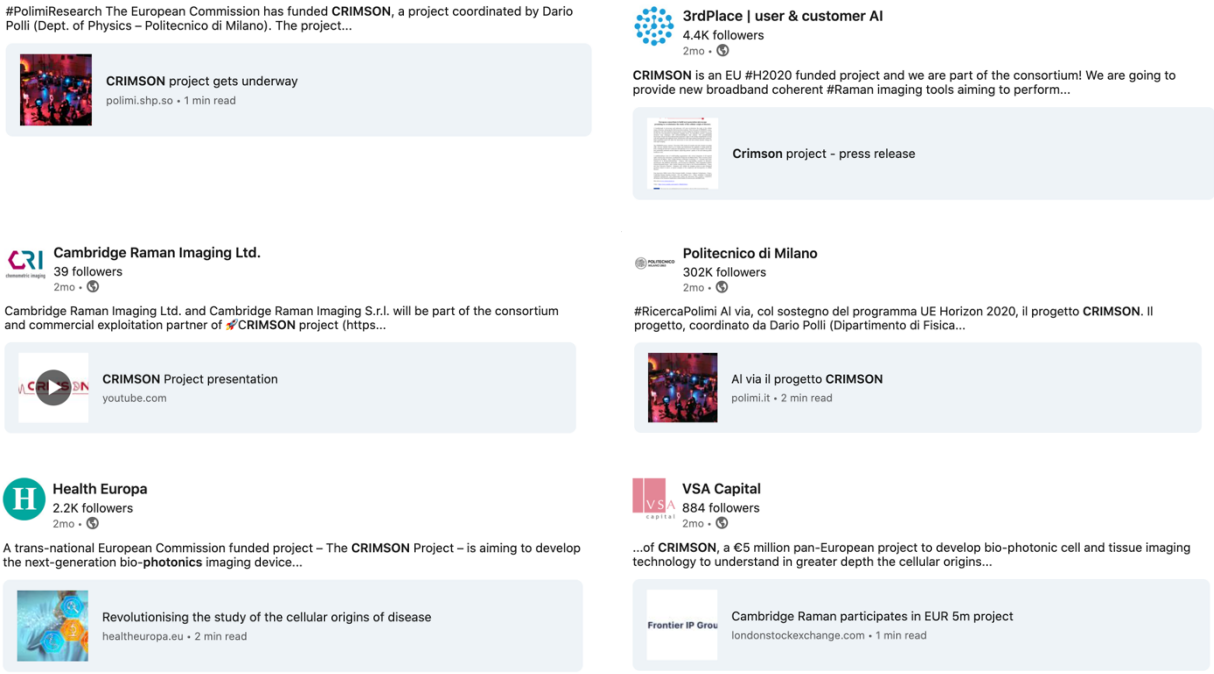
Partners have been active in communicating the launch of the CRIMSON project. Partners highlighted their participation and contribution in the project through their institutional websites. We provide below a selection of the pages from the different partners' websites.







Partners have also been active in promoting the project through different communication media. We provide below a sample of the communication messages appeared on different social media.



3.2 Communication on different media

The communication on the CRIMSON project has been very active since the beginning of the project. At M3, several international and national media have presented or mentioned the project. A sample of the communications appeared on different media is contained in the repository shared with the EU Commission and with Photonics21. The following media have already presented the project.

optics.org — Click here to download pdf

EurekAlert! AAAS — Click here to download pdf

ABOUTPHARMA — Click here to download pdf

NEWS MEDICAL LIFE SCIENCES — Click here to download pdf

SCIENMAG Science Magazine — Click here to download pdf

Scienza online — Click here to download pdf

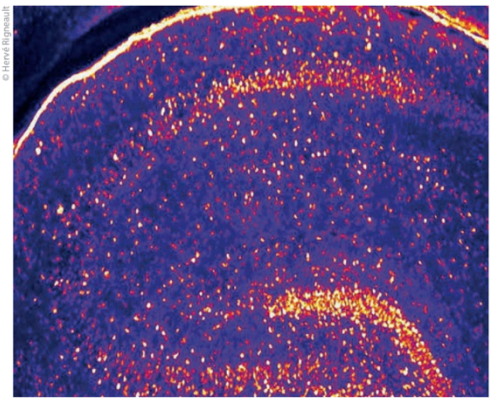
PS PANORAMA DELLA SANITÀ — Click here to download pdf

i-TALICOM — Click here to download pdf

Tecnomedicina — Click here to download pdf

CRIMSON has also been presented in the journal of LASERLAB-EUROPE, the integrated initiative of European laser infrastructures funded by the EU Horizon 2020 research and innovation programme. The journal in pdf format is available at link: https://www.laserlab-europe.eu/news-and-press/newsletter-archive/laserlab_issue30.pdf

News



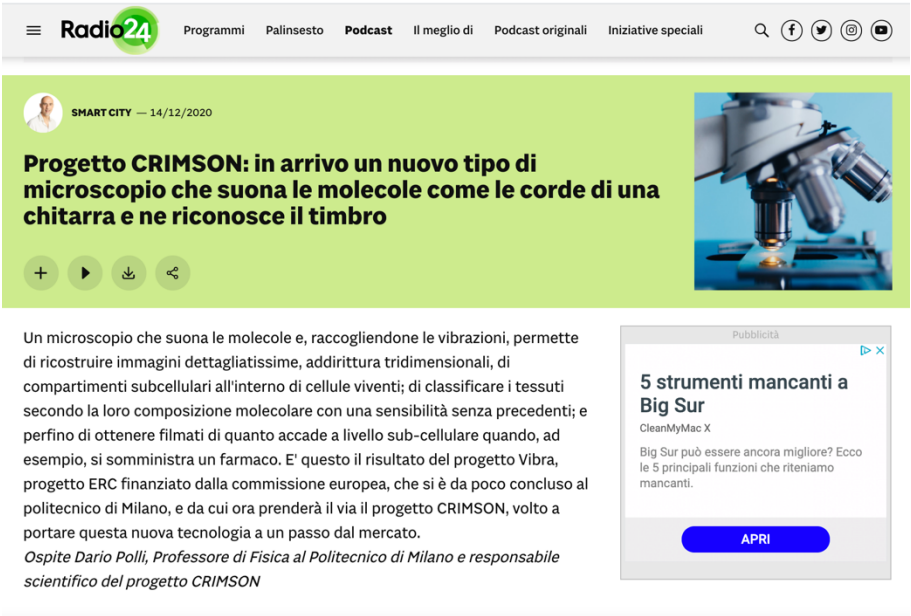
2-photon image of a mouse brain slice with GFP labelled neurons.

Next-generation microscope to revolutionise the study of the cellular origin of diseases

CRIMSON, a trans-disciplinary and transnational research project recently granted 5 million euros over 42 months by the European Commission, aims to revolutionise precision medicine by developing the next generation of bio-photonics imaging devices for biomedical research, combining advanced laser techniques with artificial-intelligence data analysis. It can provide 3-D quantitative maps of sub-cellular compartments in living cells and organoids and enables fast tissue classification with unprecedented biomolecular sensitivity. High acquisition speeds will allow the observation of intra and inter-cellular dynamic changes by time-lapse imaging.

The consortium is coordinated by Politecnico di Milano (Italy) and features three research centres (POLIMI, Leibniz IPHT, Germany, and Institut Fresnel, CNRS, France), who will use their long-standing expertise in photonics, spectroscopy and nonlinear microscopy to develop the technology. Three biomedical partners (Istituto Nazionale Tumori, Institut National de la Santé et de la Recherche Médicale, and Jena University Hospital) will validate the imaging system on open biological questions. More info is available at www.crimson-project.eu

Partners have already presented the project in different events. For instance, an interview with the project coordinator has been hosted by Radio24, the most influential business radio in Italy. The radio interview (in Italian) is available on the shared repository.



The innovation platform of the Lombardy Region dedicated to open innovation (https://www.openinnovation.regione.lombardia.it/) has also highlighted the aim and the expected results of the CRIMSON project. The platform has been active since 2015 and serves as a hub for sharing and promoting research-enabled collaboration among industry, university, and public administration. Details are available at https://www.openinnovation.regione.lombardia.it/it/b/633/il-microscopio-per-la-medicina-del-futuro-da-crimson-guidato-dal-polim.

ACCEDI O REGISTRATI | IT

Regione Lombardia | Open Innovation | Cerca

Il microscopio per la medicina del futuro? Da "CRIMSON", guidato dal PoliMi

Grazie a laser e A.I. potrà indagare l'origine cellulare delle malattie. Dalla UE 5 milioni

di **Redazione Open Innovation** | 26/01/2021

La Commissione Europea ha dato l'ok al finanziamento di oltre cinque milioni di euro e ha così potuto prendere il via il progetto coordinato dal Politecnico di Milano "CRIMSON" (Coherent Raman Imaging for the Molecular Study of the Origin of Disease). Un programma importante, che punta a sviluppare strumenti di microscopia ed endoscopia di nuova generazione, in grado di indagare l'origine cellulare delle malattie con un importante apporto innovativo nella Medicina di Precisione.

"Crimson" è un progetto che ha l'obiettivo – attraverso la **combinazione di tecniche laser avanzate con sofisticate analisi dati basate su algoritmi di Intelligenza Artificiale** - di sviluppare un dispositivo di **imaging biofotonico** di prossima generazione per la ricerca biomedica: un microscopio che sarà quindi in grado di fornire **mappe tridimensionali quantitative** di compartimenti subcellulari in cellule viventi e organoidi. Uno strumento che consentirà dunque una **rapida classificazione dei tessuti** con una sensibilità biomolecolare senza precedenti, creando filmati dei processi intracellulari e delle dinamiche tra le varie cellule dei tessuti.

Il consorzio che lavorerà a questo programma è composto da alcune tra le realtà scientifiche più importanti a livello internazionale e specializzate in fotonica, spettroscopia e microscopia non lineare.

Oltre al Politecnico di Milano vi lavorano infatti il Leibniz Institute of Photonic Technology e.V (Germania) e il Centre National de la Recherche Scientifique (Francia). Il sistema di imaging verrà poi convalidato su questioni biologiche di grande interesse relative allo studio del cancro, grazie al contributo dell'Istituto Nazionale dei Tumori (Italia), dell'Institut National de la Santé et de la Recherche Médicale (Francia) e dello Jena University Hospital (Germania).

Infine **quattro PMI innovative** (Active Fiber Systems GmbH - Germania, Lightcore Technologies - Francia, Cambridge Raman Imaging Limited - Regno Unito e 3rdPlace Srl - Italia), tra cui un produttore di apparecchiature biomedicali, sfrutteranno commercialmente l'innovazione, creando così **un vantaggio competitivo nel mercato europeo** della biofotonica, della microscopia e degli strumenti di ricerca e sviluppo.

I nostri canali social

Facebook

Open Innovation Lombardia

Twitter

Open Innovation Lombardia

Tweet di @LombardiaInnova

Open Innovation @LombardiaInnova

Quali sono i futuri trend e le sfide che il manifatturiero dovrà affrontare? Ecologia, sostenibilità e riciclo, ecco le parole chiave per un'economia orientata al domani.

Guarda l'intervista a Marco Taisch
ow.ly/zLBH50JKGLh

Open Lombardia NEXT GENERATION

Gli scenari di innovazione: intervista a Marco Taisch

29m

A more comprehensive list communication initiatives is contained in the project website, in the News page: https://www.crimson-project.eu/news/

3.3 News and events related to the project

The news section of the CRIMSON website (https://www.crimson-project.eu/news/) offers a glimpse of the several communication activities performed by the partners. Communication shows that the community of CRIMSON researchers has been extended with several complementary profiles. Among them, Salvatore Sorrentino, currently a PhD student in Physics at Politecnico di Milano in VIBRA; Dr Subir Das, who studies nonlinear optical microscopy, fluorescence lifetime imaging, optical beam-induced current Imaging and ultrasound in the context of the CRIMSON project at POLIMI; Dr Sisira Suresh, who carries out research in nonlinear optical microscopy at Fresnel institute, Dr Samuel Métais, whose interest cover the fundamental wave physics, and multi-wave phenomena and who will develop broadband coherent Raman spectroscopy and imaging in the project working at Fresnel institute.

Beside scientific dissemination (see deliverable D5.2) realised through publications appeared in journals, preliminary results of the project have been presented in

conferences. For instance, the medical student Hoang-Ngan Nguyen from the UKJ team presented the results of his studies on hyperspectral definition of head and neck tumour margins at the 3rd International Symposium on Tumor-Host Interaction in Head and Neck Cancer in Essen (Germany). IF-CNRS CRIMSON team evaluated SRS imaging in the fingerprint on a cancerous brain tissue sample. The SRS signal is x15-x20 less than in the lipid region but sufficient to perform imaging (see details at https://www.crimson-project.eu/2022/01/13/first-fingerprint-srs-image). The CRIMSON team at Lightcore Technologies developed a new distal z scanner that allow to perform multiphoton and CARS imaging over a 150mm scan range (see details at https://www.crimson-project.eu/2022/01/13/z-distal-scanner-on-the-lightcore-fip-endoscope). A model of pre-processing of coherent Raman spectra such as coherent anti-Stokes Raman spectra and stimulated Raman spectra and a comparison of spontaneous Raman and CRS measurement techniques was started within the project. This modelling is expected to lead to an understanding of the contributions of different processes to the overall CRS/Raman signal.

To highlight the potential of AI applied to image analysis, the application "ramApp" was developed in the context of the project as an easy-to-use graphical tool for the pre-processing of hyperspectral images, with a focus on maps obtained using Raman spectroscopy. The app is available online (details are available in D5.2) and a YouTube video to showcase its features was published (https://www.youtube.com/watch?v=_NdEhivoX1o).

Annex I – Press release

European consortium to build next-generation microscope promising to revolutionize the study of the cellular origin of diseases.

A breakthrough in microscopy and endoscopy will soon revolutionize the study of the cellular origin of diseases, advancing the field of precision medicine. This is the goal of CRIMSON, a trans-disciplinary and trans-national research project recently funded by European Commission. It will develop the next-generation bio-photonics imaging device for biomedical research, combining advanced laser techniques with artificial-intelligence data analysis. This ground-breaking microscope will provide three-dimensional quantitative maps of sub-cellular compartments in living cells and organoids and enable fast tissue classification with unprecedented biomolecular sensitivity. High acquisition speed will allow the observation of intra and inter-cellular dynamic changes by time-lapse imaging.

The CRIMSON project, starting 1 December 2020, lasting 42 months and with a budget exceeding 5M€, will also simulate future in-vivo studies and demonstrate the capability to image inside the body, realizing an innovative endoscope and applying it to ex-vivo thick tissue samples. The results have potentially profound societal impacts, improving patients' quality of life and reducing public healthcare costs.

A multidisciplinary team of world-leading organizations with vertical integration of all required skills composes the consortium, coordinated by Politecnico di Milano (Italy). Three research centers (Politecnico di Milano - Italy, Leibniz Institute of Photonic Technology e.V - Germany and Centre National de la Recherche Scientifique - France), with long-standing expertise in photonics, spectroscopy and nonlinear microscopy, will develop the technology. Three biomedical partners (Istituto Nazionale Tumori - Italy, Institut National de la Santé et de la Recherche Médicale - France and Jena University Hospital - Germany) will validate the imaging system on open biological questions related to cancer, as typical examples of the complexity and heterogeneity of cellular diseases.

Four innovative SMEs (Active Fibre Systems GmbH - Germany, Lightcore Technologies - France, Cambridge Raman Imaging Limited - UK and 3rdPlace S.r.l. - Italy), including a biomedical equipment manufacturer, will commercially exploit the innovation, thus creating a competitive advantage in the European biophotonics-related market for microscopes and R&D tools.

More info on www.crimson-project.eu