



DELIVERABLE 5.1

Title: D5.1 Project website, graphical identity of the CRIMSON project, project flyer and database of stakeholders



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Project website	http://crimson-project.eu/

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EXECUTIVE SUMMARY

D5.1 provides information on the communication tools and resources that have been set-up during the first 12 months of activities of the CRIMSON project. The deliverable presents an overview of the project website, that is the key communication means for the project and acts a central hub for all communication initiatives, describes the graphical resources that have been prepared in order to promote a homogeneous and effective communication, and provides information on the stakeholders databases that each partner will exploit for project communication purposes. The deliverable represents an extension of D5.4 Preliminary communication kit that already contained an initial description of the key communication resources for the project.

1 Communication and dissemination 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 10 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 Objective of the communication and dissemination activities and key identified stakeholders

The aim of the communication and dissemination activities is to promote the project results among the different stakeholder groups in order to establish strategic partnerships, further the research towards a market exploitation of CRIMSON technology. Communication and dissemination must be aligned with the exploitation plan of the project that includes the identification of the commercialization opportunities and the migration of the CRIMSON results to the industry.

Different actors in the technology supply chain of the CRIMSON project have been identified as stakeholders that can contribute to maximising the impact of the project results:

- Technology partners, such as microscopy optics suppliers, pharmaceutical, equipment suppliers, biomedical industry and laboratories equipment suppliers, translation stages suppliers, electronic boards (PCB) manufacturers and assemblers, mechanical workshops.
- The research scientific community, spanning technology (in the different branches tackled by the project) and health-oriented research institutions.

These stakeholders may contribute to the project execution and to the maximisation of the project results in different forms, by either providing research services and technology resources, by contributing to raising awareness on the results, or by participating in the commercialisation of the results.

Additional organisations can be instrumental to impact maximisation, such as:

- Policy makers and funding agencies. They comprise institutions such as the European Commission, the national and local authorities, associations addressing (e.g. PHOTONICS21, EPCI, etc.).
- Standard and Regulatory bodies. Adherence to regulatory organisations is crucial for exploitation of CRIMSON results. Among the bodies that can be addressed by

the communication and dissemination activities are the certificate bodies (e.g. IEC61010 standard)

- Media and the general public. Media organisations can contribute to raising awareness on the results of the project and be a productive boomerang.

In order to pursue communication and dissemination towards the stakeholders, based on the identification of the key messages and the agreement on the general communication principles, a set of tools have been developed in the first year of activity of the project. They comprise the project website and the social media pages, a visual identity toolkit and a set of communication materials; a database of the stakeholders to whom the project communication and dissemination activities will be addressed.

1.3 Key communication messages and principles

As anticipated in D5.4, the Communication of the CRIMSON project serves the two major objectives of (i) creating awareness and consensus among the project partners on the need to communicate effectively the research project, and the project results among the general public and to different non-scientific stakeholders, and of (ii) sharing a communication strategy among the partners supported by a set of common tools.

The general principles that inspire the communication activities of the CRIMSON project comprise:

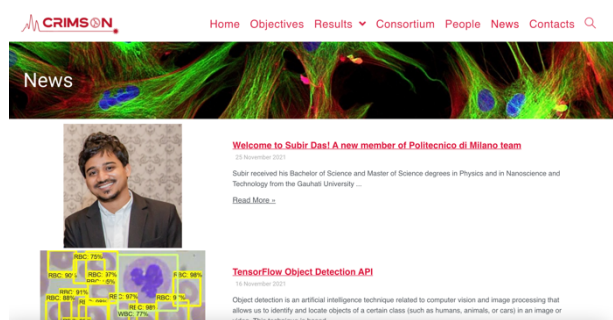
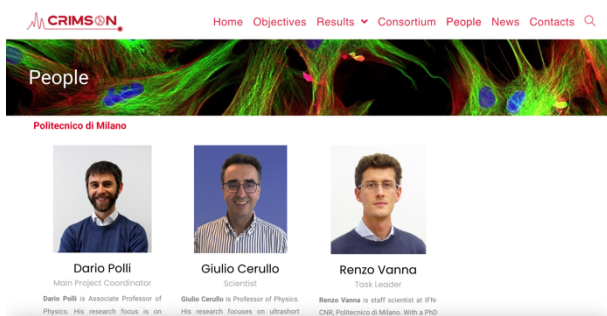
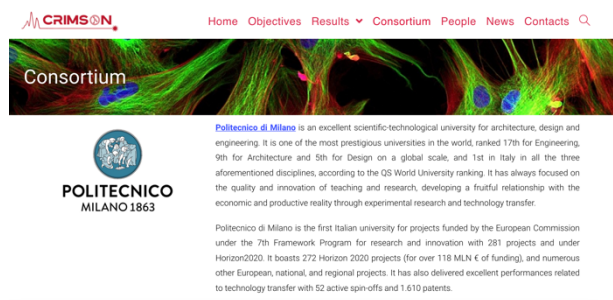
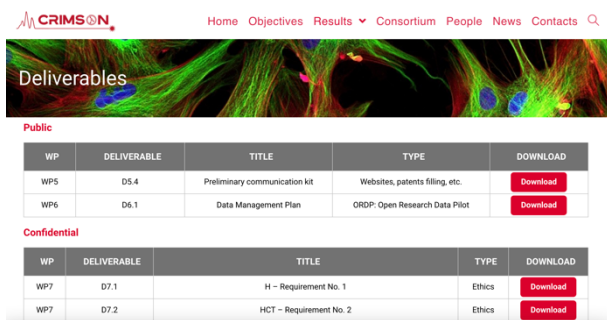
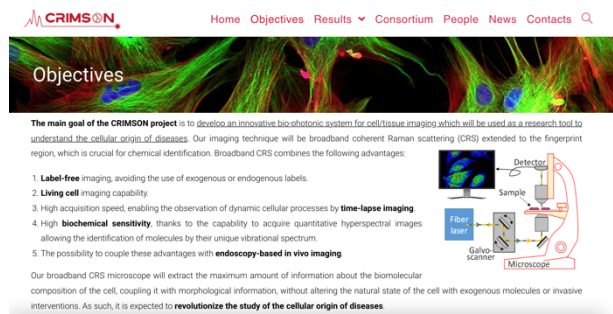
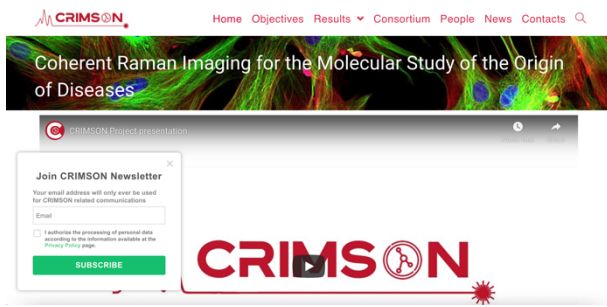
- Building a project identity through a toolkit that was created at the beginning of the project and that will enable a harmonized communication action.
- Development of "simple, but not simplified" communication. Partners are already familiar with Horizon 2020 projects communication, but during Kick-off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

2 Project website and social media

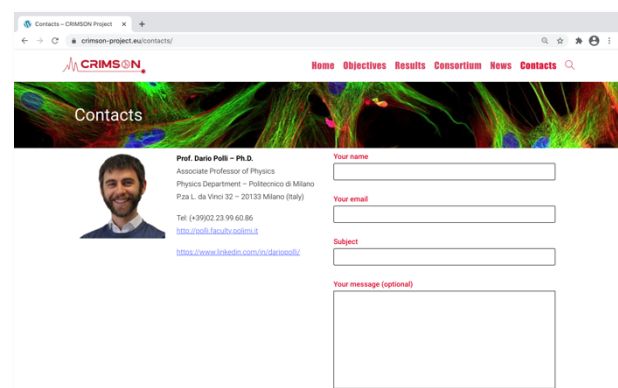
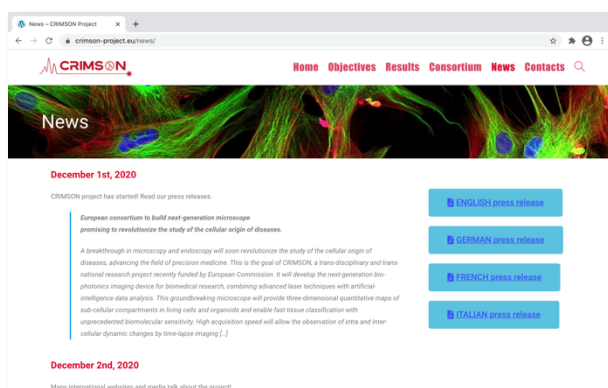
The project website serves as the central hub for the communication activities of the project. The website of the CRIMSON project can be reached at: www.crimson-project.eu.

The CRIMSON website information architecture is organised to highlight the key element of a Horizon2020 project and offers pages dedicated to: project objectives, results (i.e. deliverables), the partners of the project, the key people involved in the project activities,

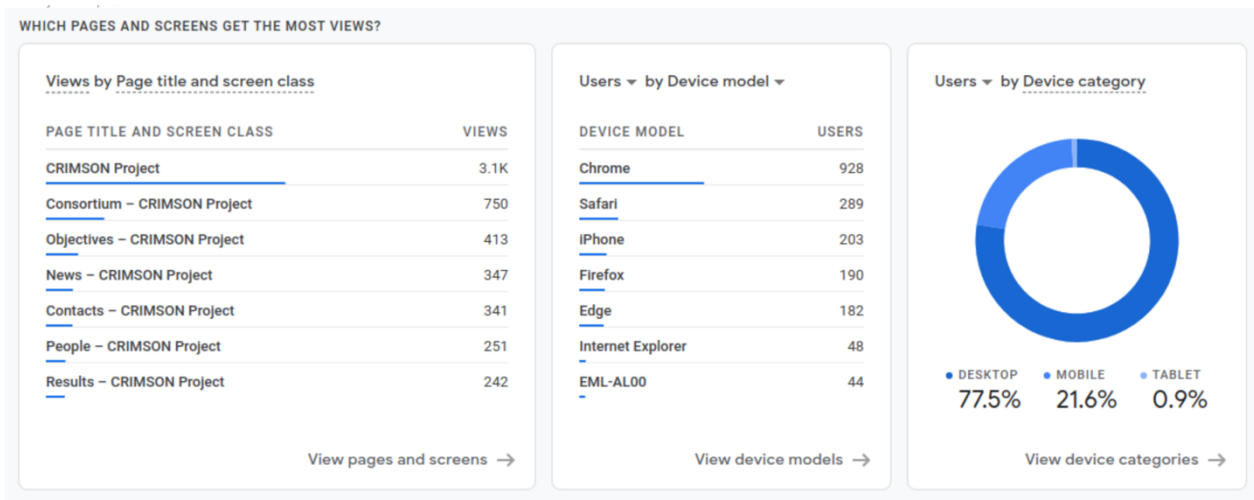
and the project news. Preliminary screenshots of the website were included in D5.4. We provide below some of the updated pages of the website.



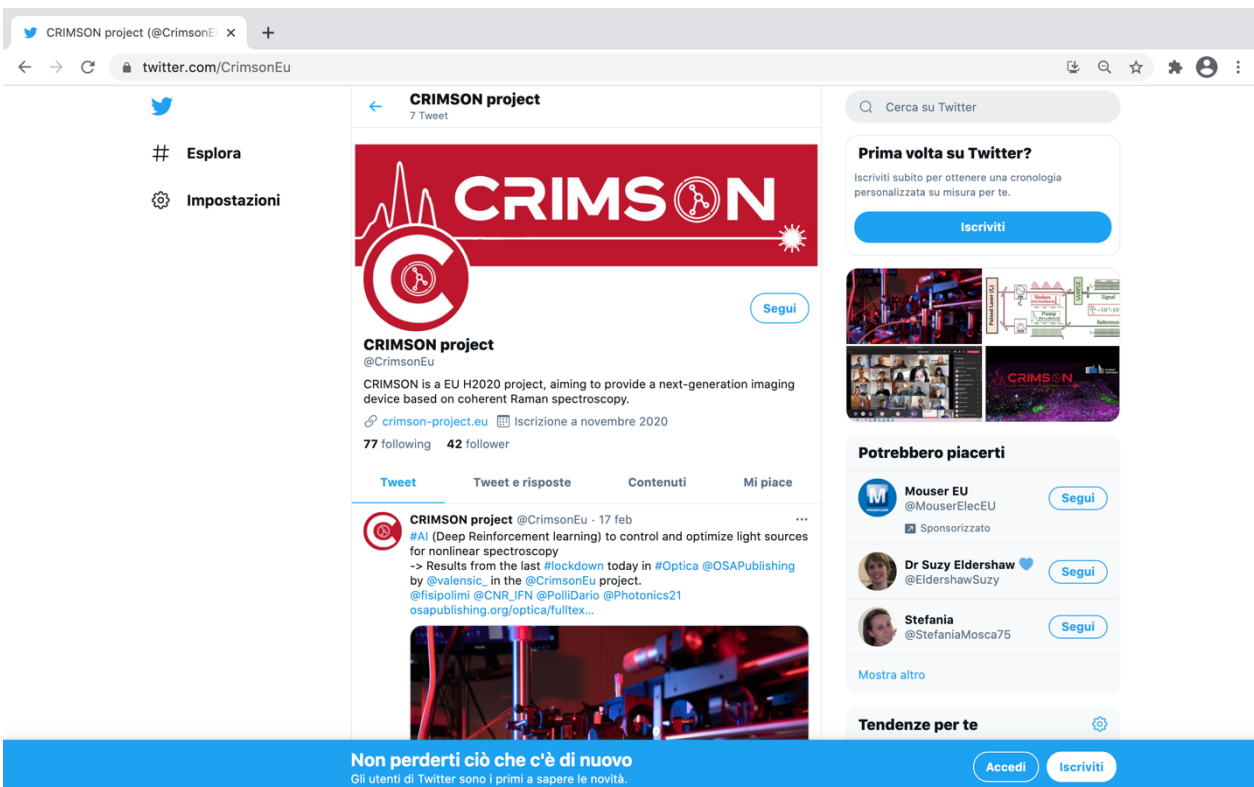
In addition to presenting the project, the website also offers to the visitors some tools to be in contact with project and be updated on the project activities through the registration to the CRIMSON newsletter and a "contact" section.



At the time of delivery of the present deliverable, the project gathered interest from an extensive number of visitors. The website pages have been visited 3.000+ times. Most visits are concentrated on the partners and on the project objectives.



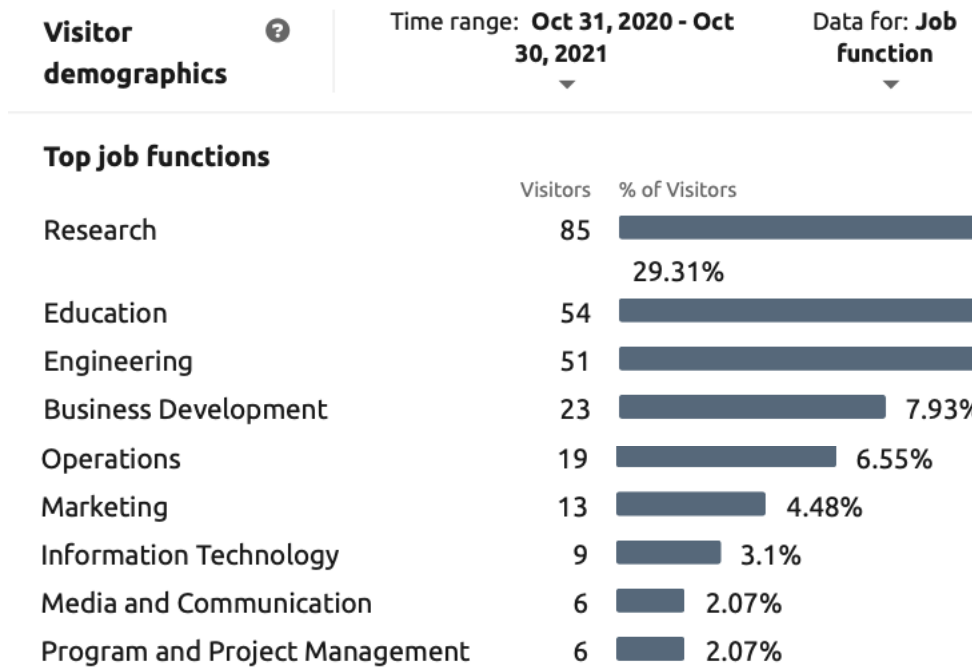
Complementary to the communication supported by the project website, social media are being exploited to quickly communicate with stakeholders. In particular, a Twitter and a LinkedIn accounts dedicated to CRIMSON were created.



The figure below offers the statistics for the last 28 days of activity of the Twitter account, highlighting 682 views.



The LinkedIn page is available at <https://www.linkedin.com/company/crimson-project/> and currently it is followed by 124 followers. Over the first 12 months of activity of the project, the page has been visited 250+ times, mainly (85%) by visitors classified as “research”.



3 Communication tools and resources

3.1 Visual identity pack and logo

As already presented in D5.1, the visual identify pack for the project was prepared at the beginning of the project 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 of different proposals and few iterations of suggestions and revisions.

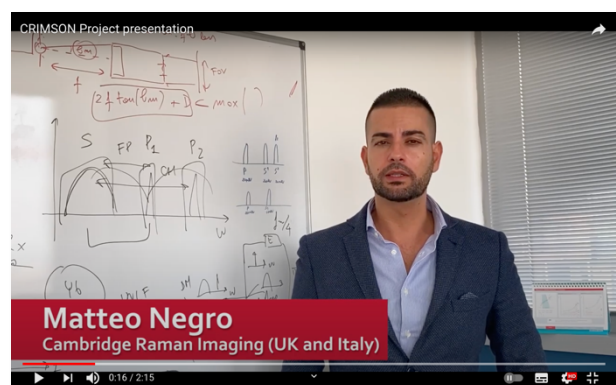
3.2 Communication video

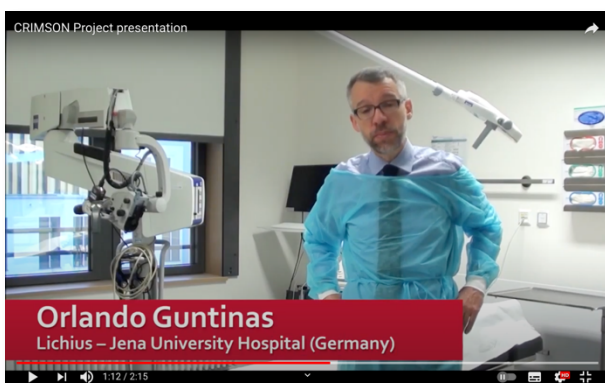
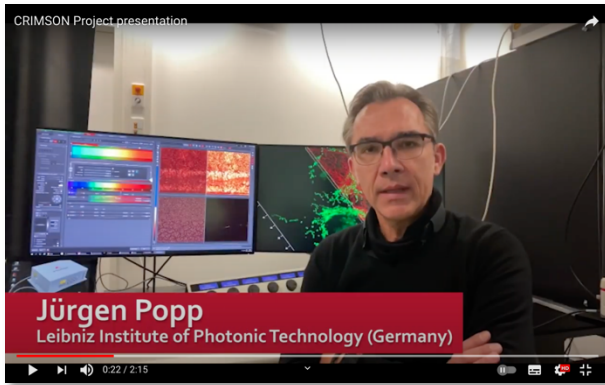
To draw the attention of the general public in a straightforward form, a video recalling project objectives and activities was implemented. The video design followed some general guidelines:

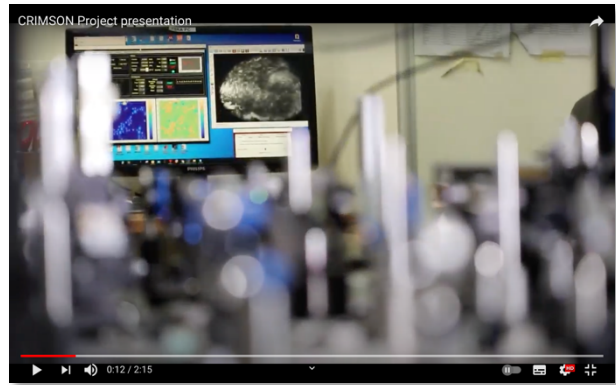
- Provide an immediate view on the aim and ambition of the project.
- Underline the results and benefits for society that the project will generate through the advances in precision medicine.
- Highlight the benefits of a research-industry collaboration in delivering new technology that have the potential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







The video has been created through a collaborative effort of all partners.

3.3 Press kit

In order to coordinate activities and guarantee homogeneous communication, a press release has been 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=NEtjOCN2s>

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CRIMSON Page 1



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 Bildgebungsggerät 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 Istituto 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 Krebskrankheiten 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=NEtjOCN2s>




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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 transnational 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=NEtjOCNe2s>



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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 organoïdi 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 intracellulari 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=NEtjOCNe2s>



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3.4 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.





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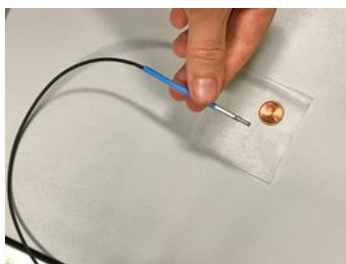
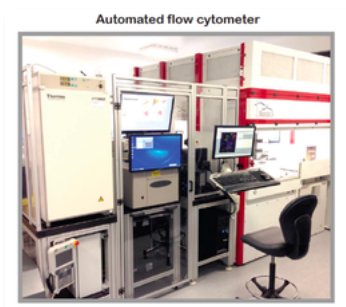
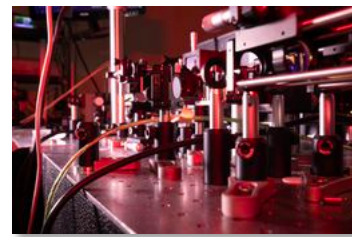
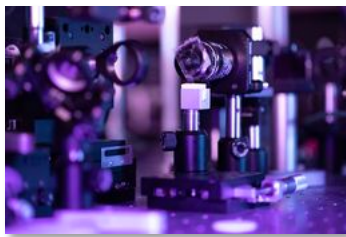
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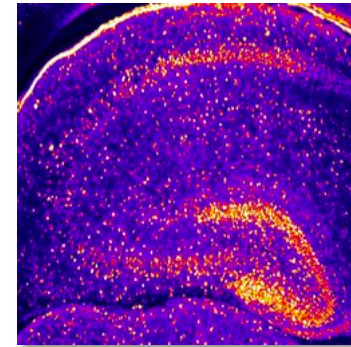
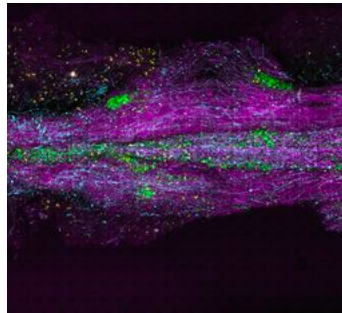
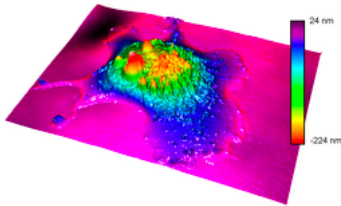
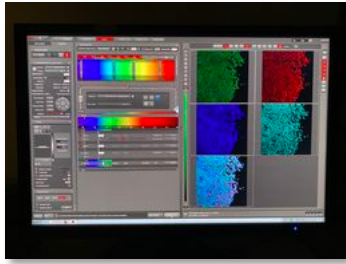
Page Break ¶



3.5 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.





3.6 Project general presentation

A PowerPoint presentation has been prepared to introduce to the general audience the key objectives of the project, the organization of the activities and of the case studies, the partners collaborating in CRIMSON. The full presentation is included as an annex to this deliverable.



COHERENT RAMAN IMAGING
FOR THE MOLECULAR STUDY
OF THE ORIGIN OF DISEASES

<http://crimson-project.eu/>

Call: "Disruptive photonics technologies" (ICT-36-2020)
Grant agreement number 101016923



Next-generation microscope

CRIMSON will build next-generation microscope and endoscope promising to revolutionize the **study of the cellular origin of diseases**, advancing the field of precision medicine.

This groundbreaking bio-photonics imaging device 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. It will combine **advanced laser techniques** with **artificial-intelligence data analysis**.



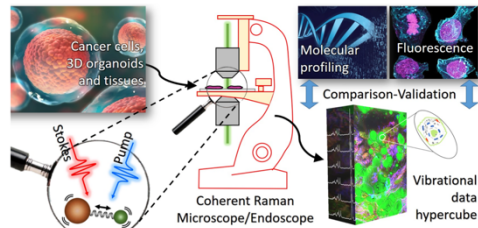
Objectives

Innovative bio-photonics system for **cell/tissue imaging** as a research tool to **understand the cellular origin of diseases**. Advantages:

- 1) **Label-free** imaging, avoiding the use of exogenous or endogenous labels.
- 2) **Living cell** imaging capability.
- 3) High acquisition speed, enabling the observation of dynamic cellular processes by **time-lapse** imaging.
- 4) High biochemical **specificity** and **sensitivity**: **quantitative** hyperspectral images in the **fingerprint** -> higher information content. Analyzed by **artificial intelligence** methods to uniquely identify molecules by their vibrational spectrum.
- 5) Compact, alignment-free and low-cost **fiber laser** system.
- 6) Complete broadband CRS **microscope for commercial exploitation**, coupled to a **flexible CRS endoscope** for future semi-invasive in-vivo imaging.

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Infographics



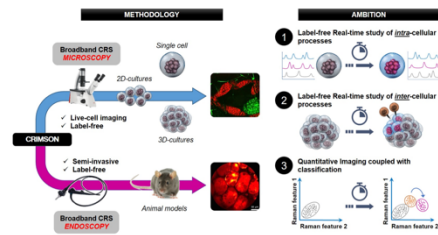
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3 case studies

1. **Autophagic processes**, used by cells to recycle their content in order to boost their metabolism or to respond to external stress, which may be involved in cancer progression.
2. The interaction between cancer and **immune cells** that occurs when the immune system attempts to target and attack cancer cells, which is of great relevance for immune-oncology.
3. **Senescence**, a stable cell-growth arrest involved in tumour reversion/progression. This process entails an extensive set of intra and extracellular changes that normally must be visualized by multiple approaches.

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Methodology and ambition



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Partners

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4 Stakeholders database and initial communication activities

4.1 Stakeholders databases

All CRIMSON partners are active in their respective domains of research and business activity. Therefore, the consortium can count on an extensive and heterogeneous network of stakeholders that will be part of the communication and dissemination activities. The following table recalls the stakeholders' databases of the project partners.

<p>POLIMI</p> <p>Politecnico di Milano is one of the most outstanding universities in the world, among the top 20 in the three areas of specialisation: Engineering, Architecture, and Design (according to QS World University Ranking). The university is one of the main beneficiaries of EU funds for research and has participated in 750+ projects mainly funded under the EU Research Framework Programmes, collaborating with 4.700+ institutions. The extensive network of stakeholders is usually an asset for the communication, dissemination and exploitation of research projects results.</p> <p>Fondazione Politecnico (linked third party to POLIMI) can count on an extensive network of stakeholders contacts that has been developed through the participation to several national and international projects. FPM holds a database of 2.400+ contacts comprising: around 350 large companies, 200 public organisations, around 450 universities and research institutions, 1.000+ SMEs, and around 400 other institutions and organisations.</p>
<p>LEIBNIZ-INSTITUT FUER PHOTONISCHE TECHNOLOGIEN E.V.</p> <p>Leibniz Institute of Photonic Technology provides connections to an extensive network of stakeholders that has been developed through their involvement in a great variety of national and international projects and initiatives. Leibniz IPHT maintains a database of estimated 4.000 + contacts among them 500 large companies, 200 public organisations, 1.500 universities and research institutions, 1.000 SMEs, 500 other institutions and organisations.</p>
<p>CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS</p> <p>INSERM is the National Institute of Health and Medical Research in France. INSERM collaborates with higher research organizations, university hospitals, education institutions, health operators, patient organizations, foundations and industry.</p> <p>It partners with the most distinguished research institutions in the world. More than 6000 collaborations were reported with external partners.</p> <p>INSERM is present in over 100 countries with over half of its collaborations in Europe and one quarter in the USA.</p>
<p>FONDAZIONE IRCCS ISTITUTO NAZIONALE DEI TUMORI</p> <p>The IRCCS Foundation - National Cancer Institute (INT) is a foundation and government-designated centre for treatment and research (IRCCS). The INT is a leading cancer care and research centre in Italy, exploring and developing the fields of biomedicine and public health, in order to deliver high quality healthcare services. INT is a reference center national</p>



and international for both the most frequent and the most frequent cancers rare and pediatric. With 540 dedicated people and 27 laboratories, it is today a pole of excellence for pre-clinical, translational and clinical research activities of assistance and epidemiology. Defined as 'Complete Cancer Center', as established by the Organization of Institutes of Cancer Europeans (OECE), the INT has always supported networking among cancer institutes are essential to face the complex challenge posed by cancer to patients, healthcare stakeholders and society. With 10 patents and 5 Pathology Registers Institutional, it is affiliated with over a dozen international organizations for cancer research and treatment (OECE, UICC, WIN, EORTC) and is a member in the Cancer Core Europe network made up of the 7 main European Cancers Center. In the INT 2020 portfolio: 785 clinical studies, 959 articles published on international scientific journals, 194 projects funded by public bodies and private. In 2020 the hospital counted 13,500 patients hospitalized and over one million 173 thousand visits and examinations. In addition to research and clinical activities, the Institute is deals with training, hosting 180 university postgraduates.

INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE

Institut Fresnel has established relations with 200+ universities and research institutions, around 80 large and medium size companies and around 50 other institutions and organizations. These contacts have been active through the participation to several national and international research and industry-oriented projects.

CAMBRIDGE RAMAN IMAGING LTD

The company is currently incubated in the Politecnico di Milano university incubator, PoliHub. It can leverage the extensive network of the incubator, as well as that of Politecnico di Milano and of its foundation. Furthermore, CAMBRIDGE RAMAN IMAGING is a partner of EPIC - European Photonics Industry Consortium, the industry association that promotes the sustainable development of organisations working in the field of photonics in Europe.



4.2 Activities performed by the partners through institutional websites

Partners have been active in communicating the launch of the CRIMSON project. We provide below a sample of the messages appeared on different media.

Physics - Politecnico di Milano
523 followers
6d •

[+ Follow](#)

Intelligenza Artificiale per migliorare la ricerca e ottimizzare i tempi di sperimentazione. Questo è il risultato dello studio di [Carlo Michele Valensise](#), [Dario Polli](#) e [Giulio Cerullo](#) pubblicato sulla rivista Optica, frutto dell' ...see more

[See translation](#)



Polimi getta un ponte tra intelligenza artificiale e ottica
adnkronos.com • 3 min read

Politecnico di Milano
302K followers
2mo •


#RicercaPolimi AI via, col sostegno del programma UE Horizon 2020, il progetto **CRIMSON**. Il progetto, coordinato da Dario Polli (Dipartimento di Fisica...



AI via il progetto **CRIMSON**
polimi.it • 2 min read


Institut Fresnel
821 followers
2mo •

Aujourd'hui, c'est le Kick-off Meeting du projet européen #CRIMSON coordonné par Politecnico di Milano et auquel notre UMR CNRS - Centre national de la...



Home
crimson-project.eu • 2 min read


#PolimiResearch The European Commission has funded **CRIMSON**, a project coordinated by Dario Polli (Dept. of Physics - Politecnico di Milano). The project...



CRIMSON project gets underway
polimi.shp.so • 1 min read

3rdPlace | user & customer AI
4.4K followers
2mo •


CRIMSON is an EU #H2020 funded project and we are part of the consortium! We are going to provide new broadband coherent #Raman imaging tools aiming to perform...



Crimson project - press release

Cambridge Raman Imaging Ltd.
39 followers
2mo •

Cambridge Raman Imaging Ltd. and Cambridge Raman Imaging S.r.l. will be part of the consortium and commercial exploitation partner of **CRIMSON** project (https...



CRIMSON Project presentation
youtube.com

Politecnico di Milano
302K followers
2mo •


#RicercaPolimi AI via, col sostegno del programma UE Horizon 2020, il progetto **CRIMSON**. Il progetto, coordinato da Dario Polli (Dipartimento di Fisica...



AI via il progetto **CRIMSON**
polimi.it • 2 min read

Health Europa
2.2K followers
2mo •


A trans-national European Commission funded project - The **CRIMSON** Project - is aiming to develop the next-generation bio-photonics imaging device...



Revolutionising the study of the cellular origins of disease
healtheuropa.eu • 2 min read

VSA Capital
884 followers
2mo •

...of **CRIMSON**, a €5 million pan-European project to develop bio-photonics cell and tissue imaging technology to understand in greater depth the cellular origins...



Cambridge Raman participates in EUR 5m project
londonstockexchange.com • 1 min read



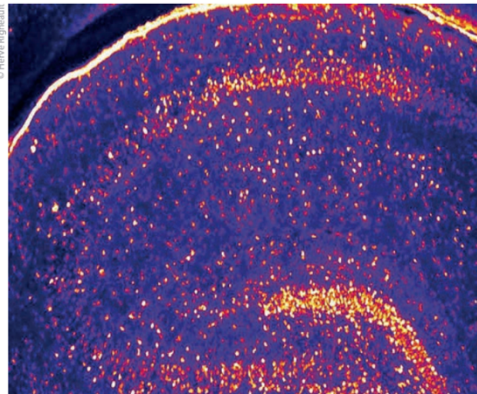
4.3 Communication on different media

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.



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.



Radio24 Programmi Palinsesto Podcast Il meglio di Podcast originali Iniziative speciali

SMART CITY — 14/12/2020

Progetto CRIMSON: in arrivo un nuovo tipo di microscopio che suona le molecole come le corde di una chitarra e ne riconosce il timbro

Un microscopio che suona le molecole e, raccogliendone le vibrazioni, permette di ricostruire immagini dettagliatissime, addirittura tridimensionali, di compartimenti subcellulari all'interno di cellule viventi; di classificare i tessuti secondo la loro composizione molecolare con una sensibilità senza precedenti; e perfino di ottenere filmati di quanto accade a livello sub-cellulare quando, ad esempio, si somministra un farmaco. E' questo il risultato del progetto Vibra, progetto ERC finanziato dalla commissione europea, che si è da poco concluso al politecnico di Milano, e da cui ora prenderà il via il progetto CRIMSON, volto a portare questa nuova tecnologia a un passo dal mercato.

Ospite Dario Polli, Professore di Fisica al Politecnico di Milano e responsabile scientifico del progetto CRIMSON

5 strumenti mancanti a Big Sur
CleanMyMac X
Big Sur può essere ancora migliore? Ecco le 5 principali funzioni che riteniamo mancanti.

APRI

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

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 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



Annex 2 – Presentation of the project

PowerPoint presentation prepared to introduce the project to a wide audience that was (and will be) used in public events and meetings.



COHERENT RAMAN IMAGING FOR THE MOLECULAR STUDY OF THE ORIGIN OF DISEASES

<http://crimson-project.eu/>

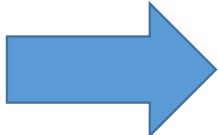
Call: “Disruptive photonics technologies” (ICT-36-2020)

Grant agreement number 101016923



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- 
1. Objectives
 2. Partners



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Next-generation microscope

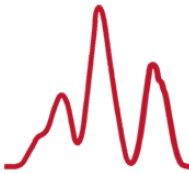


CRIMSON will build next-generation microscope and endoscope promising to revolutionize the **study of the cellular origin of diseases**, advancing the field of precision medicine.

This groundbreaking bio-photonics imaging device 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. It will combine **advanced laser techniques** with **artificial-intelligence data analysis**.



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Objectives



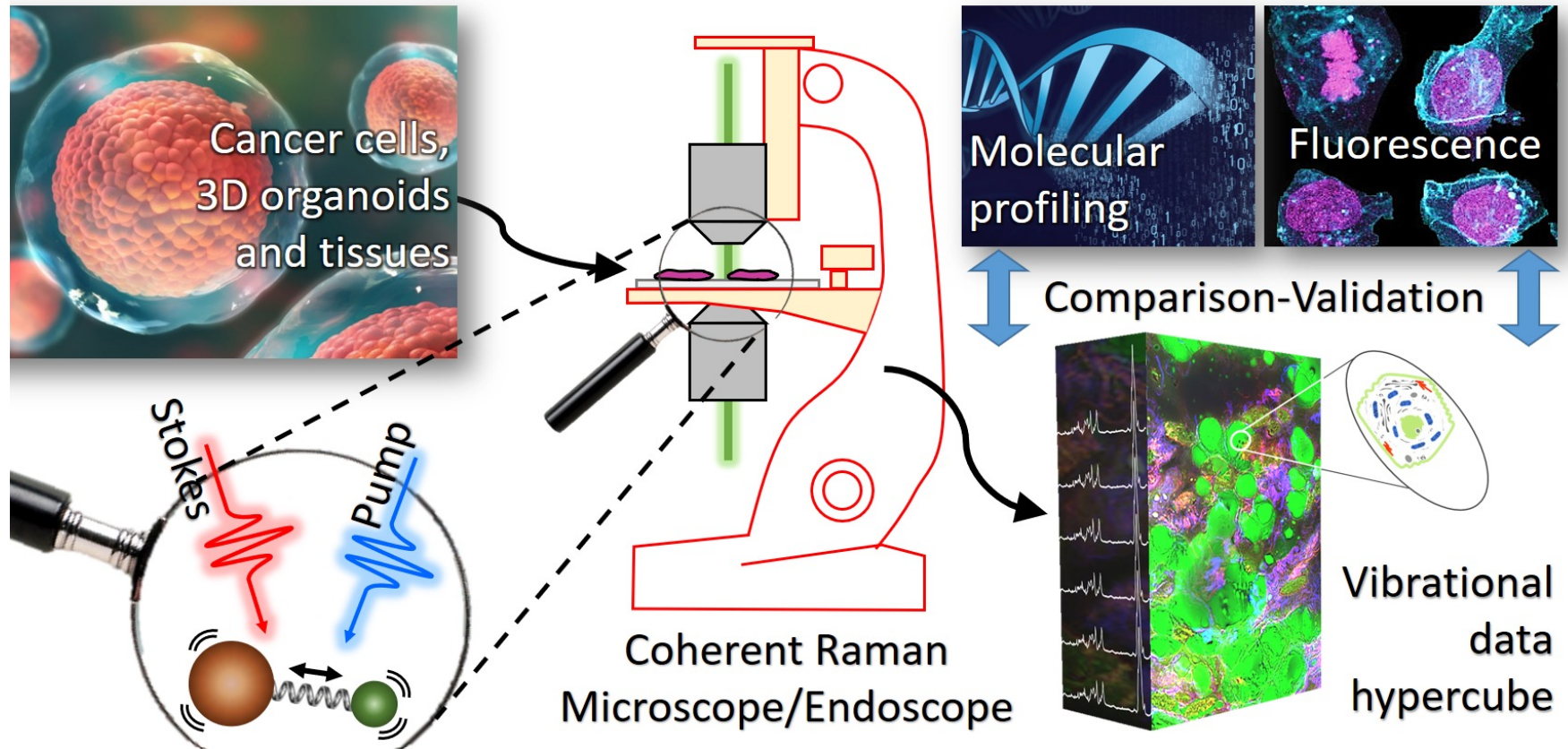
Innovative bio-photonic system for **cell/tissue imaging** as a research tool to **understand the cellular origin of diseases**. Advantages:

- 1) **Label-free** imaging, avoiding the use of exogenous or endogenous labels.
- 2) **Living cell** imaging capability.
- 3) High acquisition speed, enabling the observation of dynamic cellular processes by **time-lapse** imaging.
- 4) High biochemical **specificity** and **sensitivity**: **quantitative** hyperspectral images in the **fingerprint** -> higher information content. Analyzed by **artificial intelligence** methods to uniquely identify molecules by their vibrational spectrum.
- 5) Compact, alignment-free and low-cost **fiber laser** system.
- 6) Complete broadband CRS **microscope for commercial exploitation**, coupled to a **flexible CRS endoscope** for future semi-invasive in-vivo imaging.



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Infographics



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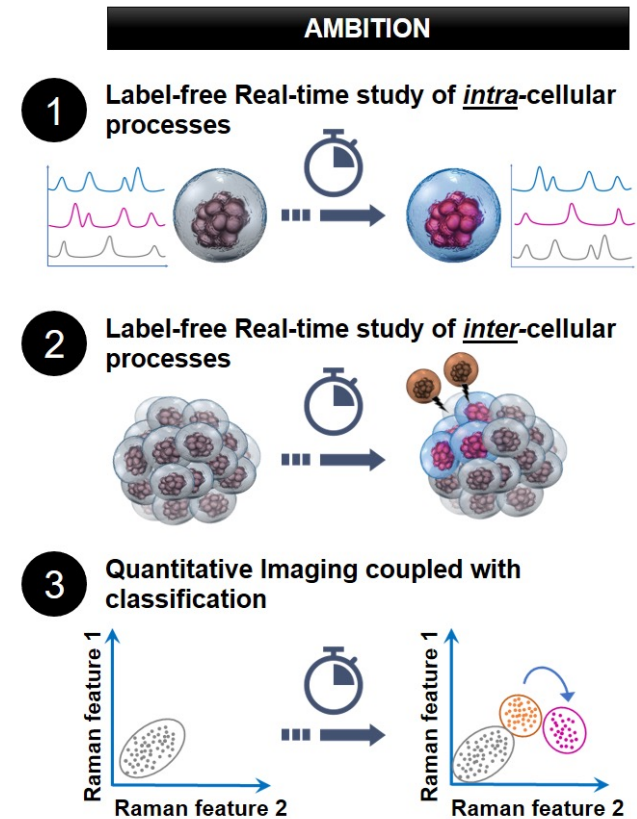
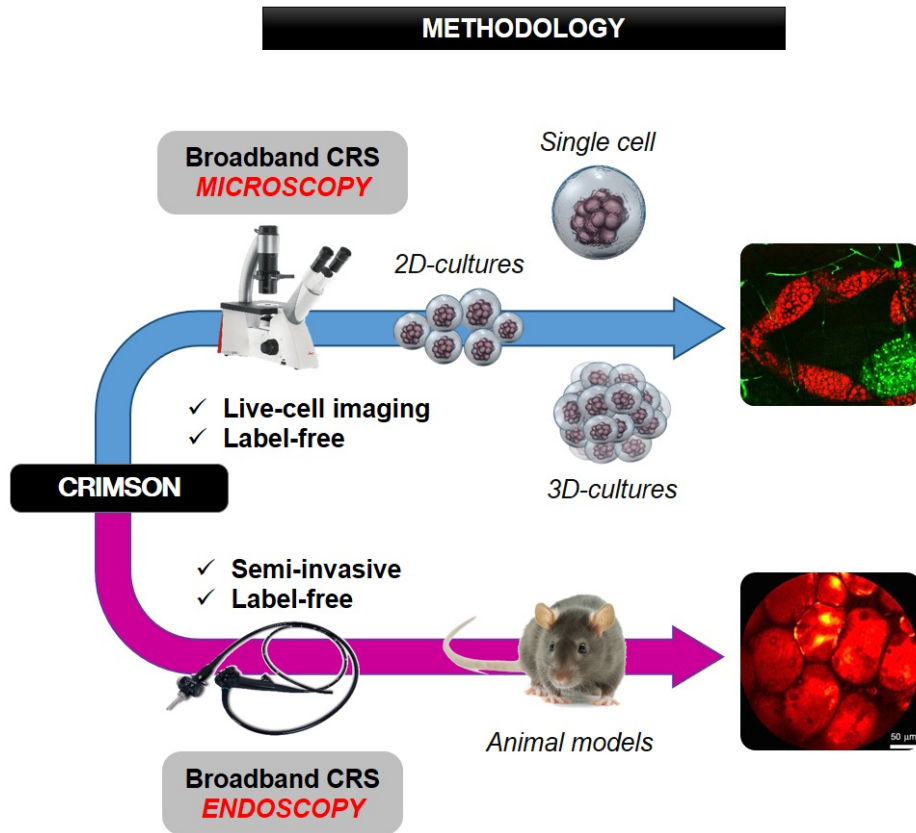
3 case studies



1. **Autophagic processes**, used by cells to recycle their content in order to boost their metabolism or to respond to external stress, which may be involved in cancer progression.
2. The interaction between cancer and **immune cells** that occurs when the immune system attempts to target and attack cancer cells, which is of great relevance for immune-oncology.
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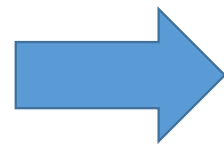
Methodology and ambition



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1. Objectives




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Partners

 <p>POLITECNICO MILANO 1863</p>	 <p>Leibniz ipht</p>	 <p>cnrs INSTITUT FRESNEL</p>	 <p>FONDAZIONE IRCCS ISTITUTO NAZIONALE DEI TUMORI</p>	 <p>Inserm</p>
 <p>UNIVERSITÄTS KLINIKUM jena</p>	 <p>activefiber systems</p>	 <p>LIGHTCORE technologies</p>	 <p>CRi chemometric imaging</p>	 <p>3rdPlace user & customer AI</p>



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POLIMI

- 1400 professors + 1200 technical/admin employees.
- 43k students (900 PhD candidates), 30% international
-  Ranked 17th for Engineering, 9th for Architecture, 5th for Design, 1st in Italy
- 400 EU projects in H2020 (>177 M€)
- 52 active spin-offs and >2000 patents

Physics Department:

- 60 permanent staff members, >30 temporary researchers, about 90 PhD students
- Fundamental and applied research activity
- >150 publications per year
- >3M€ funding per year



POLITECNICO
MILANO 1863



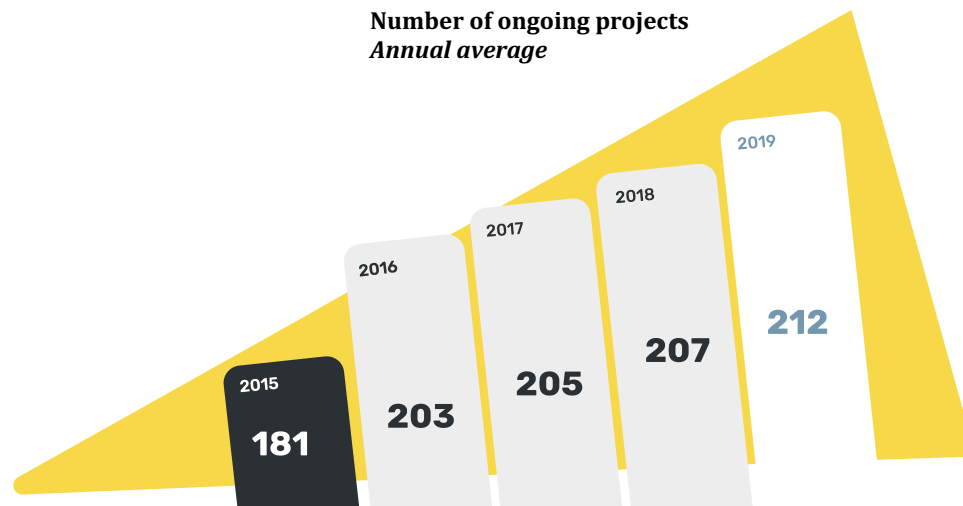
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Fondazione Politecnico di Milano

Fondazione Politecnico di Milano **was established in 2003 on the behest of Politecnico di Milano, city's main institutions and the regional government of Lombardy, with the support of several important business companies.**

Promotion, management and communication of research are the building blocks of an approach founded on the capacity to obtain finance and reinject it back into the system, fuelling a virtuous circle that encourages growth

In 2019 overall financial value of funded projects managed 90+ million €.

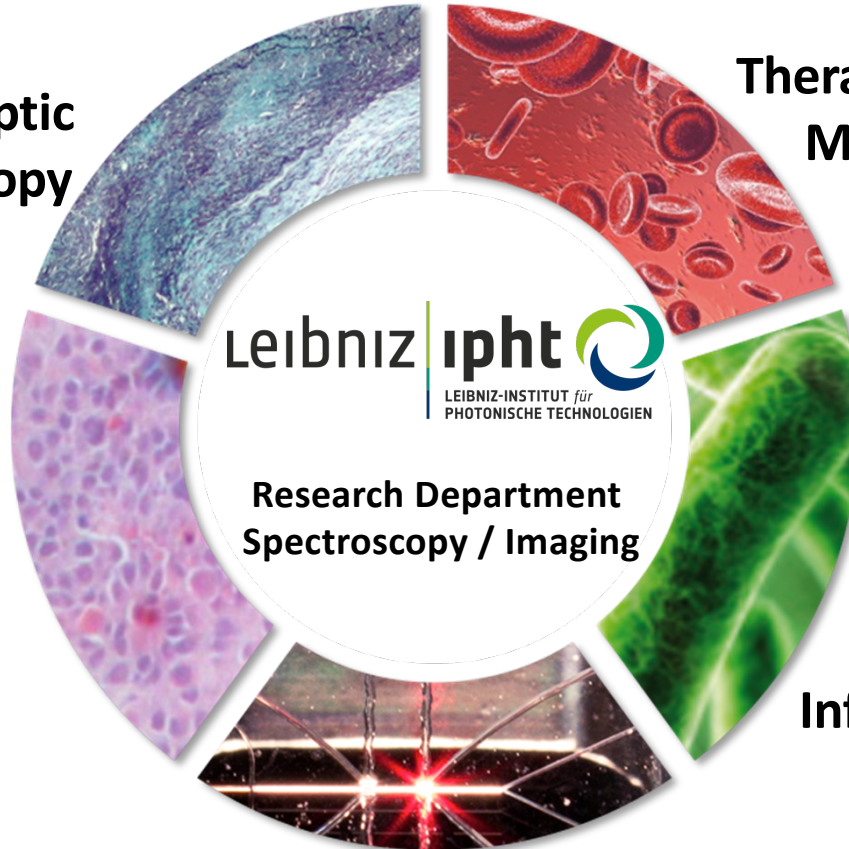


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Fiber Optic Endoscopy

Therapeutic Drug Monitoring

Histopathology of Cells and Tissue



Research Department Spectroscopy / Imaging

Identification of Tumor Cells

Key Figures	
370	Employees
incl. 100	Doctoral Candidates
≈ 200	Publications / Year
25 Mio €	General Budget
Incl. ≈ 13 Mio €	Project Funding



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IF-CNRS



CNRS: Centre National de la Recherche Scientifique
National FR research agency (all fields – 32000 people)



Institut Fresnel: CNRS research unit specialized in

- Photonics, optical sciences, optical engineering
- Electromagnetism modelling (optical, THz)
- Signal/image processing



Mosaic group

- **Advanced microscopies** (super-resolution, polarization resolved, phase, scattering media, FCS, photo-acoustics, nonlinear), **Fiber probes**
- Nanophotonics, Mathematical optics
- Cell and tissue morphogenesis

<https://www.fresnel.fr/sip/spip.php?article1418>



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Istituto Nazionale dei Tumori di Milano

The National Tumor Institute "INT" in Milan was established in 1928 and became a public IRCCS Foundation in 2006.

INT is a Comprehensive Cancer Center (CCC) since 2013.

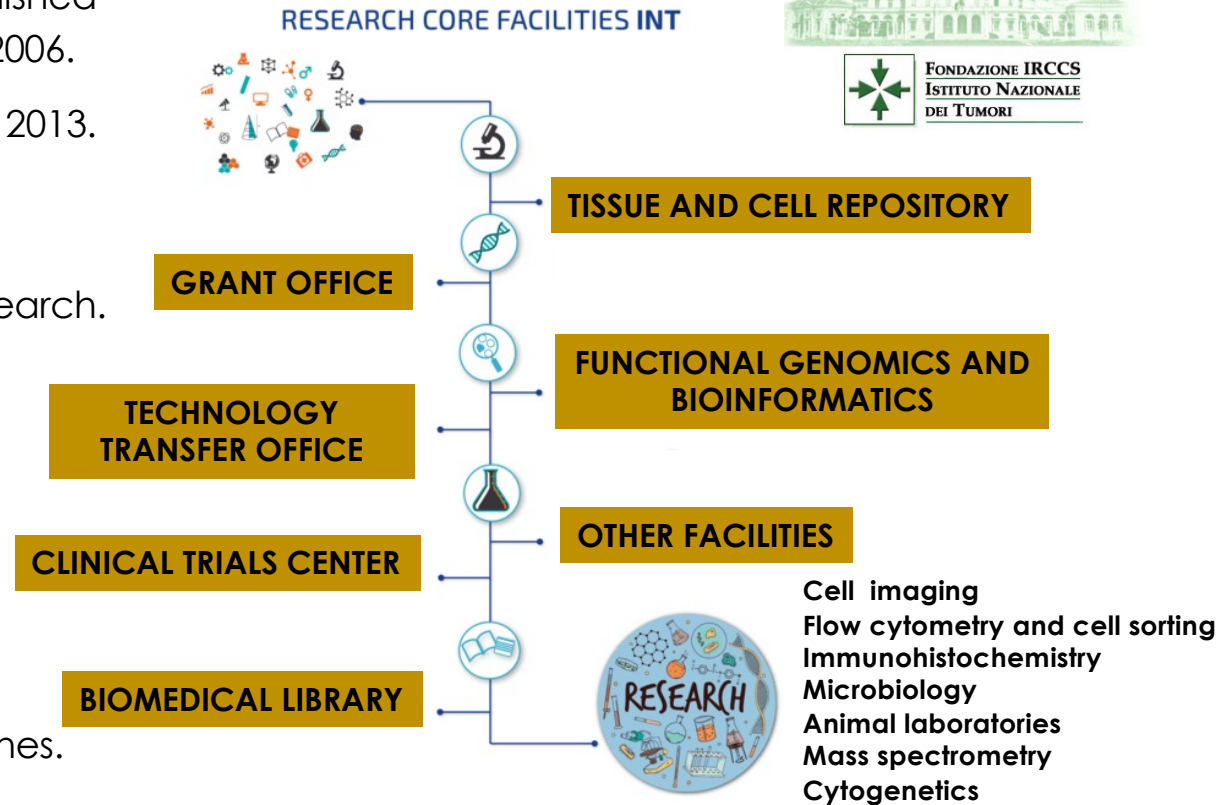
It conducts translational and bidirectional research, moving from basic research, healthcare needs, epidemiology, clinical results, and back to basic research.

INT is deeply committed to quality education and training.

INT is a formal partner of the Università Statale degli Studi di Milano.

Since 1997 INT has partnered with the Open University (Milton Keynes, UK) to offer a PhD Programme for young graduates in scientific disciplines.

RESEARCH CORE FACILITIES INT



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Istituto Nazionale dei Tumori di Milano

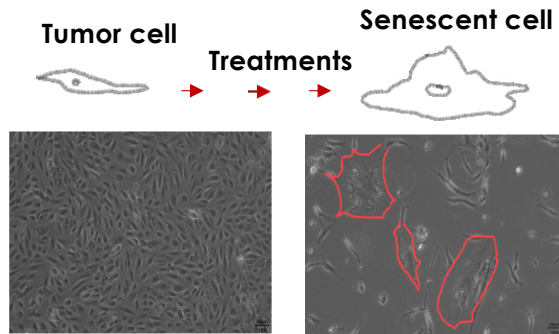


FONDAZIONE IRCCS
ISTITUTO NAZIONALE
DEI TUMORI

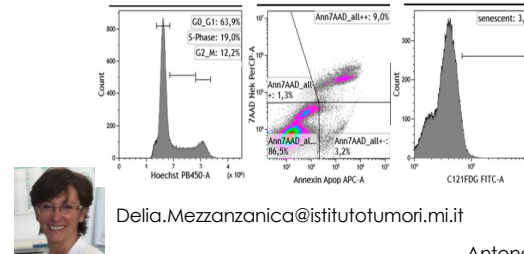
Identification of senescent cells induced by treatments



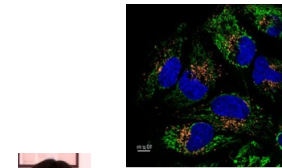
MariaGrazia.Borrello@istitutotumori.mi.it
Angela.Greco@istitutotumori.mi.it



Cytofluorimetric analysis



Fluorescence-based microscopy



Antonella.Tomassetti@istitutotumori.mi.it



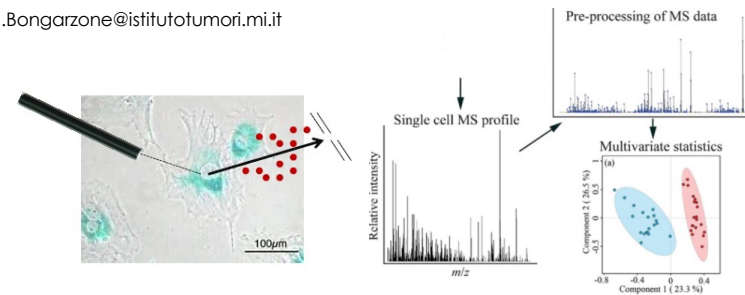
Young fellow
PhD applicant

Multi-omics



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Single-cell transcriptome 10X genomics
Single cell imaging mass spectrometry



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INSERM



Prof. Guido Kroemer

<http://www.kroemerlab.com>
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Crimson scientific staff:
claugrajeda@gmail.com,
isabellemart@gmail.com



Cell biology platform, fluorescence-based phenotypic screening platform

Dr. Oliver Kepp, senior researcher, Director



Metabolomics-mass spectrometric platform coupling liquid- and gas chromatography to a series of different last-generation
Dr. Sylvère Durand, operational director



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Jena University Hospital (JUH)



- Jena University Hospital is the only university hospital for the federal state Thuringia, i.e. an area of 2.2 million inhabitants
- Jena University Hospital is the largest employer in the region with 5,600 employees, >300,000 patients per year, 2.400 medical students
- The Department of Otorhinolaryngology started as a Department of Otology in 1884
- Head and neck cancer is main focus in clinical routine & research
- Optics and biophotonics important tools for research on new diagnostics and therapy concepts:

Main topics: Head neck cancer / chronic inflammation

Head neck cancer: tumor border definition / early detection

Fluorescence-based techniques: Near-infrared endoscopy, CLE

Marker-free techniques: OCT, MSOT, **multimodal non-linear imaging including Raman**

Automated image analysis

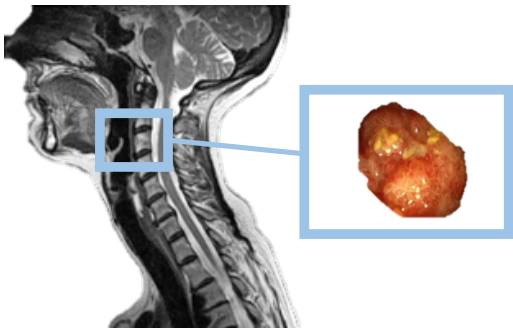
Combination with laser ablation, robotics



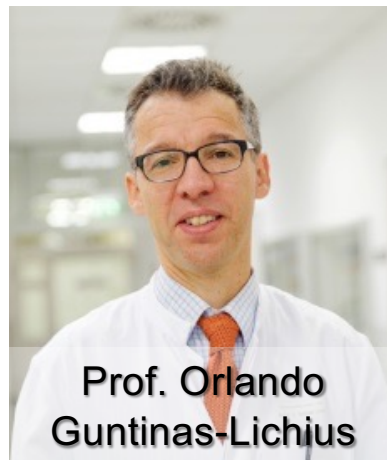
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Jena University Hospital (JUH)

- Clinical partner for all questions related to (1) head and neck cancer & immune oncology; (2) Applications with cells, tissue, patients
- Application of CRS tools in clinical settings
- Providing access to patients, tissue samples, cell lines, histological data



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Prof. Orlando
Guntinas-Lichius



Dr. Franziska
Hoffmann



Prof. Ferdinand
von Eggeling



Daniela
Pelzel



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Active Fiber Systems GmbH

- SME Laser manufacturer from Jena, Germany
- Core competence: turnkey ultrafast fiber lasers “beyond the state of the art”
- Main markets: unique scientific high-power systems, industrial micro-machining, compact life-science/bio-imaging sources
- Goal within CRIMSON: development of compact and robust fiber laser source adapted to the specific demands of the project partners
- Two systems will be provided to CRIL and LIGHTCORE for integration and evaluation

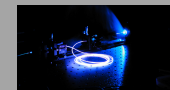


activefiber
systems

Pulse Generation



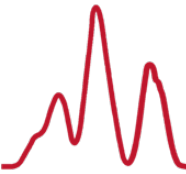
Amplification



FWM



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Lightcore Technologies



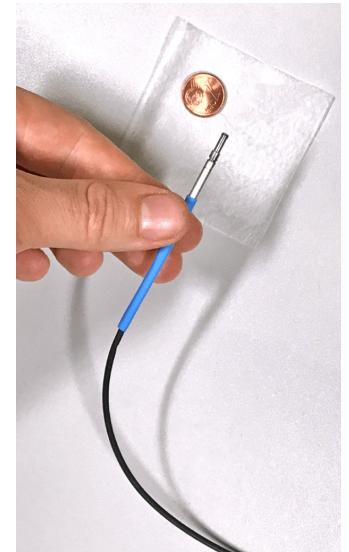
LIGHTCORE
technologies



Lightcore Technologies is a spin-off of Institut Fresnel, XLIM and PhLAM (expertise in scanning endoscopy systems with fibers optimized for ultrashort pulse delivery).

Flagship product: standalone endoscopy system for multimodal imaging (currently supporting TPEF, 3PEF, SHG and THG). Strong focus on R&D to develop a platform able to address multiple markets including the hospital (in the long-term perspective).

Goal within CRIMSON: developing and commercializing a portable endoscope with the compact source from AFS with broadband CRS and multiphoton imaging capabilities; application to the selected case studies



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CRI – Cambridge Raman Imaging



CRI is a spin-out of Cambridge University and Politecnico di Milano
CRI has an **headquarter in the UK** (CRI Ltd.) and a **subsidiary in Italy** (CRI S.r.l.) established to become the development and manufacturing center



Our focus is on bringing to market high speed, label-free Raman imaging instruments.

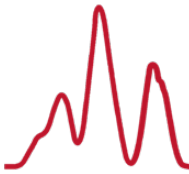


Our first application is in **medical imaging microscopy**, delivering better patient outcomes through **faster and more accurate tumour diagnosis and treatment**.

We have a team of 8 people with **fiber lasers and CRS microscopy design capabilities**



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3rdPlace SRL



3rdPlace is a data-driven tech company founded in 2010 by former Google managers, focusing on: Augmented Analytics solutions for data governance, data modeling, and data platform.

Office: Milan (headquarter), Cagliari, Viterbo (Rome)

Staff: 34 employees including data scientists and fullstack developers

Our Skills: Data analysis, machine learning, computer vision, data visualization, Big Data, Cloud computing

EU Funded projects experience:

- [SSIX](#) - Social Sentiment analysis financial Indexes
- [CS-AWARE](#) - Cybersecurity awareness and information sharing
- [C-BAS](#) - Customer Behaviour Analysis System
- [NewMed](#) - Innovation on precision and personalised medicine
- **Organ-Vision** - Real-time visualizing and modelling of fundamental process in living organoids

Some of our customers:



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