

FIRST NEWSLETTER – Mar 2021

Welcome to the first newsletter!

CLARIFY is an innovative, multinational, multi-sectorial, and multidisciplinary research and training programme that links two highly differentiated specialities: engineering and medicine, to produce 12 Early Stage Researchers in artificial intelligence (AI), cloud computing and clinical pathology with the focus on digital pathology. The Consortium is composed by 4 Universities, 2 companies, 3 hospitals and 3 partner organizations from all over Europe.



CLARIFY constitutes a very valuable research instrument to improve the knowledge about how AI and cloud computing can support the fast detection, diagnosis and prognosis of cancer, at the same time that revolutionize how pathological practice is understood nowadays.

The goal of this bianual publication is to reach out scientific community, public authorities, private companies, students and the general public keeping them constantly informed about the last outcomes of the CLARIFY project, including scientific results, events, dissemination actions, secondments, training activities, etc.

This first newsletter will offer a project overview. Future editions will provide updates on the progress of the work and project-related news and events.

More info is available on the website: www.clarify-project.eu

What is Digital Pathology?

Digital pathology is an image-based information environment that enables the management and interpretation of pathological information generated from the digitalization of a tissue sample. It is only recently that it started to improve scanning, storage, data transfer speeds, and advances in software and computer processing power and it made digital pathology progress possible. Digital pathology offers a number of potential benefits, as it makes it easier to share cases between multiple pathologists, enables automatic image interpretation through AI and increases diagnostic efficiency.

BENEFICIARIES



PARTNER ORGANIZATIONS



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What will CLARIFY network do?

CLARIFY will generate methods and knowledge to facilitate **automatic histological image interpretation and diagnosis everywhere** as a paradigm shift in the pathology field with the aim of **maximizing the benefits of digital pathology** and aiding pathologists in their daily work.

Specific and challenging cancer types have been selected to test the methods developed through the project reflecting the existing variability in cancer diagnosis: **Triple negative breast cancer (TNBC)**, **High-risk non-muscle invasive bladder cancer (HR-NMIBC)** and **Spitzoid melanocytic lesions (SML)**.

[Click here to watch our introductory video](#)

Key elements of CLARIFY

- **Advanced image processing techniques and artificial intelligence methods.**

Universitat Politècnica de València (UPV), Universitetet i Stavanger (UiS), Universidad de Granada (UGR) and Tyris Software SL (TY) are working along with Fundación INCLIVA, Helse Stavanger HF (SUH) and Erasmus Universitair Medisch Centrum Rotterdam (EMC) on the development of AI algorithms for automatic whole-slide-image (WSI) interpretation with two purposes: diagnosis and image retrieval.

- **Novel cloud-oriented data infrastructure and algorithms**

Universitetet i Stavanger (UiS), Universiteit van Amsterdam (UvA) and bitYoga AS (bY) are focused on secure data storing, retrieving and sharing assuring data interoperability and portability.



- **Innovative and user-friendly software**

All CLARIFY partners will collaborate to design **computer-aided diagnosis and content-based image retrieval** tools based on artificial intelligence and cloud-computing algorithms to improve workflow efficiency, stimulate collaboration and increase diagnostic confidence at pathology labs no matter their location.

CLARIFY ESRs

The Innovative Training Networks (ITN) aim to train a new generation of creative, entrepreneurial and innovative **early-stage researchers (ESRs)**, able to face current and future challenges and to convert knowledge and ideas into products and services for economic and social benefit. Within this context, CLARIFY's training programme has been designed to produce a **new generation of interdisciplinary researchers able to deal with digital pathology challenges**. This includes enrolment in a PhD program (in two tracks: engineering and medicine) as well as further complimentary technical/clinical training to complete the multidisciplinary view they require to fulfil their individual research projects and training in horizontal and transferable skills.

Right now, we are very happy to announce **all ESRs are in place and starting their careers**. We want to take this opportunity to present them as well as the individual projects they are already working on.

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ESR1: Na Li, Universiteit van Amsterdam: *“Semantic interoperability of digital pathology data via common formal terminology”*



ESR2: Yuandou Wang, Universiteit van Amsterdam: *“Seamless trusted data sharing techniques”*



ESR3: Jiahui Geng, bitYoga AS: *“Taking computation to Data: integrating BigData and Blockchain allowing secure analysis of sensitive health data on-premise”*



ESR4: Neel Kanwal, University of Stavanger: *“Preprocessing, segmentation and anonymization of WSI”*



ESR5: Saul Fuster Navarro, University of Stavanger: *“Extracting diagnostic and prognostic information from histological images of NMIBC”*



ESR6: Claudio Fernández - Universitat Politècnica de València: *“Significant feature extraction from WSI for diagnosis and prognosis of TNBC”*



ESR7: Laëtitia Launet - Universitat Politècnica de València: *“Deep learning for spitzoid melanocytic lesion (SML) characterization”*



ESR8: Arne Schmidt - Universidad de Granada: *“Probabilistic large scale crowdsourcing methods for histological image classification”*



ESR9: Zahra Tabatabaei - Tyris Software S.L.: *“Strategies for cloud-based histological image retrieval”*



ESR10: Farbod Khoraminia - Erasmus Medisch Centrum Rotterdam: *“Improving HR-NMIBC diagnosis and prognosis by digital pathology”*



ESR11: Umay Kiraz - Helse Stavanger HF: *“Evaluation of TNBC for diagnostic and prognostic by digital pathology”*



ESR12: Andrés Mosquera-Zamudio - Instituto de Investigación Sanitaria INCLIVA: *“Analysis of the implementation of AI algorithms in the evaluation of spitzoid melanocytic tumours for diagnosis and prognosis”*

If you want to know better our ESRs, and want to hear about their motivations, aspirations and achievements:

Visit the CLARIFY's blog: www.clarify-project.eu/from-clarify-to-the-world/

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What's happening?

- Scientific publications

2020 IEEE Services: IEEE World Congress on Services (19-24 Oct-2020; Online)



Wang, Y., Zhao, Z.: Decentralized workflow management on software defined infrastructure, Workshop on The 1st Workshop On Data-Centric Workflows On Heterogeneous Infrastructures: Challenges And Directions (DAWHI), in the context of IEEE Service Congress, 2020.

Data-intensive workflow applications are characterized by their continuously growing volumes of data being processing, the complexity of tasks in the pipeline, and infrastructure capacity required for computation and storage. The infrastructure technologies of computing, storage and networking have made tremendous progress during the past years. We review the emerging trends in the data-intensive workflow applications, in particular the potential challenges and opportunities enabled by the decentralized application paradigm.

- Events and training

NETWORK TRAINING ACTIVITIES

26 Jan 2021



UPV organized and supervised the **First Virtual Fieldtrip**, an introduction to CLARIFY's partner expertise and disciplines as well as an introduction of all the ESRs.

LOCAL TRAINING ACTIVITIES

24 Oct 2020



ESR2 attended the **1st IEEE services workshop on data-centric workflows on heterogeneous infrastructures (DAWHI2020)** :

The workshop aims to establish a platform for researchers from service computing, scientific workflow management, cloud computing, big data, and relevant communities to exchange the latest experience and research ideas on data-centric applications across heterogeneous infrastructures.

1-6 Nov 2020



ESR1 attended the **19th International Semantic Web Conference (ISWC2020)**: Premier international forum for the Semantic Web / Linked Data Community

Nov 2020



ESR7 attended the **Entrepreneurship for predoctoral researchers:** Webinars organized by RUVID, the Valencian Universities Network for the support of Research, Development and Innovation.

4-5 feb 2021



ESR12 attended the **XLIV Annual Meeting SEAP-IAP 2021:** Annual Meeting of the Sociedad Española de Anatomía Patológica, the Spanish Division of the International Academy of Pathology.

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10-13 Feb 2021



ESR6-7 attended the [IEEE EMBS Grand Challenge Forum on Data Science and Engineering in Healthcare:](#)

Webinars focused on: *“Integrating engineering and medicine to address big challenges”, “AI in Medical Imaging”, “Digital Doctors: The Future of Medicine”, “Recent Advances for AI in Digital Health”*

11 Feb 2021



ESR10 attended the [Bridge meeting on Molecular and Digital Pathology:](#)

Webinar to dive deeper into disease pathology

23 Feb 2021



ESR7 attended the [MATLAB and Python: are they connected?:](#)

Webinar about integrating together developments from MATLAB and Python, allowing to make the most of the advantages of both languages

Mar 2021



ESR 6, 7, 12 attended the [New Tools for the Diagnosis of Breast Cancer:](#)

Workshop organized by ROCHE. Topics: Technical Aspects and Good Practices, New tools and application of algorithms and Review of practical cases

• Secondments

The first secondments of the project have started this month. COVID-19 pandemic has impeded the normal development of the secondments, but they started in a virtual way.

Saul Fuster (ESR5) is being virtually seconded at EMC and Claudio Fernández, Laëtitia Launet and Andrés Mosquera (ESR6, ESR7 and ESR12, respectively) at ROCHE.

Upcoming events

The **first CLARIFY Training School** will be held from Apr, 12 till 16, 2021. It will be a virtual event. Technical lectures 1 on *“Challenging diagnosis of neoplastic diseases”*, Workshop 1 on *“Responsible Research and Innovation (RRI) I”*, Seminar 1 on *“Research Epistemologies and Methods”* and Seminar 5 on *“Technological, managerial and legal competencies in healthcare”* will take place during those days.



Yuandou Wang (ESR2) will present a joint paper on the topic of Jupyter and scientific workflow in the [2020 International Conference on High Performance Computing & Simulation](#) that will be held on March 22-27 online.

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