



CAS

**Centre for
Advanced Studies**

Annual Workshop

Date: Dec. 2nd–3rd, 2021
Online

CAS Annual Workshop 2021

The JRC Center for Advanced Studies

The JRC Centre for Advanced Studies opened in 2016 with the vision of creating a stimulating, trans-disciplinary environment where the JRC could work together with external scientists to explore new and emerging scientific and societal challenges facing the EU.

As an incubator for new scientific ideas, outside the policy support activities undertaken by the JRC, the research in CAS contributes to the knowledge base of the JRC, enabling it to elaborate on policy options and their impact well ahead of time. Deliberately chosen without a thematic focus, CAS projects contribute to various Commission priorities and enable transdisciplinary thinking and exchanges across a wide range of projects, thus reflecting on the complexity of the challenges Europe is facing.

The Annual Workshop 2021

The CAS Workshop aims to build on the broader sense of community, shared interest and common purpose that the individual CAS research projects bring to their respective fields. Nevertheless, it will provide an opportunity to identify and investigate, explore and exchange, and propose and deliver ideas and experiences around shared issues, opportunities, and challenges associated with their respective areas of interest.

It will be an opportunity for those CAS projects that are just starting to formally showcase their new CAS topic proposals and set out their research programmes and objectives for the three years ahead.

In addition to allowing scientists and researchers to present their work, the Annual Workshop will provide a forum and platform for discussions with stakeholders and policymakers about what we can use from current science, the remaining open scientific questions, and where we go from here.

It will also provide an opportunity to exchange views and hear opinions around the extent and scope of the new CAS topic proposals and how these might be enhanced.

The recent Covid-19 crisis has shone a harsh light on how the pandemic has catalysed social and economic change.

This year's Workshop will include keynote speakers and panel discussions and focuses on the CAS projects to **tackling the big challenges that Europe is facing** in terms of epidemiology, environment, economy and social inequality.

Climate change is still one of the most urgent challenges facing the EU. The **CAS project NanoPlastic** – which kicked off in 2020 – is investigating the possible risks to human health and the environment of micro(nano) plastic pollution by finding strategies for its detection and monitoring.

Separately, the issue of **social inequality** has risen in importance in recent years, but with the new Digital Era and the disproportional hit of the Covid-19 pandemic on low-skilled families, the matter is now of utmost relevance. The **DIGCLASS project** - which began in January 2021 - is revising existing approaches to social class analysis and updating them to address the current technological transformation.

CAS Annual Workshop 2021

Under a similar umbrella - more focus on digitalisation and the **unprecedented amount of digital footprints** created every day - the **CCS4P project** is using Computational Social Science to describe aspects of our society and anticipate trends already present.

Lastly, the two newest projects in the CAS portfolio have resulted from the indirect consequences of the covid-10 global pandemic.

The crisis has shown the vulnerability of the EU economy to sudden shocks in the global supply chain. In that context, the **bounCEward project** - which began in 2021 and is still in an exploratory phase – focus on the concept of **Circular Economy** and is investigating the extent to which circularity can make the EU more resilient and autonomous to global economic shocks.

Nevertheless, the pandemic has also highlighted the importance of **anticipating future epidemics**. The **EPICO project** is still laying the groundwork but anticipates developing a framework based on mathematical and statistical methods to address fundamental issues on prevention, preparedness and response to public health crises.

During the Workshop, five ongoing CAS projects will be presenting their work, with the more mature projects given time to detail and discuss their preliminary findings while the newer projects lay out their research plans and objectives, allowing participants to contribute early on in their shaping and to contribute to a discussion of the scientific issues raised .The descriptions of each CAS project are in the Annex.

Agenda structure

Day 1 of the workshop will provide a showcase of all the CAS projects, 'the Roadshow'. Each CAS will introduce their project briefly and launch its respective ePosters. There is also a dedicated ePoster session on the Kubify platform for CAS projects where participants can engage lively with team members regarding their ePosters. Day 1 will also give a glance at the recent additions to the CAS portfolio (EPICO and bounCEward) and include a full presentation from the NanoPlastic project team, including experts and guest speakers.

Day 2 will be dedicated to policy needs for society during the Digital Age and will feature the CAS projects DIGCLASS and CCS4P, including presentations, informative panel discussions and Q&A sessions.

ePosters

The ePosters will be showcased using Kubify. They will be launched on Day 1, during the roadshow. This is followed by sessions during lunchtime and at the end of Day 1 for comments/questions/feedback from participants, when there will be the possibility to comment, ask questions, or provide feedback, encouraging eventually possible debate and discussion during these sessions.

During the dedicated ePoster sessions, members of the respective CAS teams will also be available to answer questions and engage with participants, providing an excellent opportunity for stimulating interaction and debate and allowing the teams to incorporate any feedback into their fuller presentations.

ePosters will be available for 1 year.

CAS Annual Workshop 2021

THURSDAY DECEMBER 2ND, Morning (09:00-12:30)

08:45 - 09:00	Coffee and Connection: https://webcast.ec.europa.eu/4th-centre-for-advanced-studies-cas-workshop-2021-12-02
Session I: Introduction and CAS Overview Chaired by Jutta THIELEN-DEL-POZO (Head of Unit A.5)	
09:00-09:10	Welcome and Opening Sabine HENZLER (Director, Strategy Work Programme & Resources)
09:10-09:20	The Centre for Advanced Studies Roadshow Video "Let's dive into CAS"
09:20-09:50	Introduction to CAS Jutta THIELEN-DEL-POZO (Head of Unit A.5)
09:50-10:30	CAS elevator Shane SUTHERLAND (CAS Programme Coordinator)
10:30-11:00	Coffee Break
Session II: Management of crisis events: a prospective vision? Chaired by Jutta THIELEN-DEL-POZO	
11:00-11:30	BOUNCE4WARD. Circular Economy, a recipe for more strategic autonomy (15') "Circular Economy, a recipe for more open strategic autonomy?" – Brian BALDASSARRE Q&A (15')
11:30- 12:30	EPICO. Epidemics: Dynamics and Control (40') Emerging Pandemics" – Nikolaos STILIANAKIS (Unit A.5) Nicola RICCETTI (Unit A.5) Augusto FASANO (Unit A.5) Jaime GOMEZ-RAMIREZ (Unit A.5) Q&A (20')
12:30-14:00	Lunch Break

CAS Annual Workshop 2021

THURSDAY DECEMBER 2ND, Afternoon (14:00-18:00)

Session III: NanoPlastics (NPs)

Chaired by Miguel-Angel BELTRAN (Project Leader, CAS 6)

14:00-14:05	Introduction Arnd HOEVELER, Head of Unit F2
14:05-14:30	Project overview and progress Miguel-Angel SERRA BELTRAN, A5 Unit project Leader. Douglas GILLILAND, F2 Unit Project Scientific Coordinator, Gabriella SCHIRINZI, Unit A5 Marisa PASSOS, Unit A5
14:30-15:30	Panel Discussion and Presentation (4x10' + 20') Ulrich SCHWANEBERG, Aachen University, Germany. NPs biotechnological approaches Julien GIGAULT, CNRS Laval University, Canada. Analytical quantitation of NPs Nicoletta RICCARDI, CNR-IRSA Pallanza, Italy. NPs in freshwater environments Miren CAJARAVILLE, UPV/EHU Leioa, Spain. NPs in marine environments
15:30-16:00	Q&A
16:00-16:15	Closing of Day 1- Shane SUTHERLAND (Head of CAS)
16:15-18:00	Video (Sophie HENRIKSSON) Poster session

CAS Annual Workshop 2021

FRIDAY DECEMBER 3RD, Morning (9:00-12:45)

08:45 - 09:00	Coffee and Connection: https://webcast.ec.europa.eu/4th-centre-for-advanced-studies-cas-worksho-2021-12-03
<p>Session IV: New Data and Methods in Social Science: Applications, Limitations and Policy Challenges</p> <p>Chaired by Michele VESPE and Leire SALAZAR (Project Leaders, CAS 7 and CAS 8 resp.)</p>	
09:00-10:20	<p>Keynote on Computational Social Science for Policy (CSS4P, CAS7) (30') Daniele QUERCIA (King's College London) Q&A (10')</p> <p>Keynote on Social Classes in the Digital Age (DIGCLASS, CAS8) (30') "Are exposed tree roots a bad thing? Pros and cons of using machine learning to study social inequalities" Paolo BRUNORI (International Inequalities Institute, London School of Economics) Q&A (10')</p>
10:20-10:40	Coffee Break
10:40-11:40	<p>Joint Panel Discussions : Computational methods in Social Classes research "Sociological expertise to understand the implications of digitalization". CAS8 Team composed of: Leire SALAZAR, Carlos Gil HERNANDEZ, Guillem VIDAL LORDA, Davide VILLANI,</p> <p>"Computational methods to model societal patterns" CAS7 Team composed of : Michele VESPE, Eleonora BERTONI, Matteo FONTANA, Lorenzo GABRIELLI, Serena SIGNORELLI,</p>
11:55-12:25	Discussion about possible synergies and Q&A session
12:25-12:45	Summing up and closing of Day 2 and of CAS workshop by Francesca CAMPOLONGO (Head of Unit Finance & Economy in Directorate B – Growth & Innovation)

ANNEX 1: SUMMARIES OF CAS PROJECTS

Projects vary in size from 1-5 scientists and are typically led by a senior scientist or project leader with an established track record or reputation in the research area concerned. Projects are time-limited to 3 years, after which they may be considered for mainstreaming into the institutional work programme of the JRC.

There are currently five CAS projects ongoing, three of which started at the end of last year and two of which are currently in the start-up or exploratory phase. The 4th Annual CAS Workshop will allow the already established projects to showcase their preliminary findings and the newest ones to start a discussion on their topics and lay the ground for their future research.

'Towards a technological platform for nanoplastics detection' NANOPLASTICS (2020 – 2023)

The project studies novel ways to detect nanoplastics by combining instrumental analytics with novel biological and biotechnological approaches in order to overcome the major limitations of existing analytical methods. The project's aim is to provide the scientific community with analytical tools which can allow the quantification of nanoplastics in a range of key matrices and thus help to reduce the knowledge gaps surrounding what may already be one of the most widely spread yet poorly understood man-made environmental pollutants. This better understanding will provide input to the policy makers who may have to define appropriate actions to safeguard both environmental and human health by tackling whatever potential risks may be presented by this ubiquitous pollutant.

Team members: Miguel-Angel Serran-Beltran (project leader), Douglas Gilliland (scientific coordination), Gabriella Schirinzi, Marisa Passos.

'Computational Social Science' CSS4P (2020 – 2023): The project envisages identifying how our digital footprint is used to describe and anticipate societal trends.

This research aims to unlock the potential of Computational Social Science for EU policy support through a balanced capacity of data scientists, statisticians, social scientists and data stewards with legal background to build partnerships with key players in the private sector while addressing legal privacy, ethical and security concerns as well as data transparency, accountability and governance challenges. Thanks to the possibility to channel research findings to policymakers, the European Commission Joint Research Centre has already successfully demonstrated its ability to attract the academic community and this research will draw on collaborations with prominent scholars in the field of Computational Social Science.

Team members: Michele Vespe (project leader), Eleonora Bertoni, Matteo Fontana, Lorenzo Gabrielli and Serena Signorelli

'Social classes in the digital age' DIGCLASS (2020 – 2023): The project aims to identify how digital technology may play a role in fuelling inequality and transforming society. Researchers to revise existing theoretical and empirical approaches to social class analysis in the social sciences and update them to address the challenges posed by technological transformations. Our work will propose new taxonomies and analytical tools, it will assess whether the traditional links between social position and life chances are altered by digitalization and whether new needs in terms of social protection are required in current societies.

DIGCLASS aims to apply them to contemporary phenomena such as:

- The decline of the middle class
- Job polarisation
- Effects of digital technologies on inequalities
- Life chances
- The emergence of new types of economic relations

Team members: Leire Salazar (project leader), Carlos J.Gil, Guillem Vidal, Davide Villani.

'Circular Economy: a recipe for more strategic autonomy' bounCEward (2021 – 2024): The project aims to investigate to which extent Circular Economy can mitigate what The COVID-19 crisis has already exposed: the EU's vulnerability to sudden shocks in the global supply chain.

Core to the EU Green Deal and NextGenerationEU, the transition to a Circular Economy with less waste and better resource use will help achieve the EU climate ambitions and reduce susceptibility to supply disruptions. The project will assess and optimise the EU's strategic autonomy for priority supply chains to build such resilience. It plans to show how circular the EU economy currently is and what actions are most urgently needed.

Team members: Brian Baldasserre (project leader)

'Epidemics and Control' EPICO (2021 – 2024): The project addresses fundamental issues in prevention, preparedness, and response of epidemics.

The focus is on the dynamics and control of vector-borne and respiratory infectious diseases, both posing a major global health threat. The aim is to develop a framework based on mathematical and statistical methods, and on data derived from routine and modern space surveillance systems.

EPICO will study aspects of spatiotemporal dynamics, early warning, seasonality, the One-Health approach, transmission modes, waning immunity, pathogenesis, the immuno-epidemiology of the disease and the assessment of pharmaceutical interventions that may inform the public health decision process.

Team members: Nikolaos Stilianakis (project leader), Augusto Fasano, Nicola Rocchetti, Jamie Gomez-Ramirez.

ANNEX II: BRIEF BIOS AND ABSTRACTS OF KEYNOTES

Session II: Management of crisis events: a prospective vision?

Brian Baldassarre is a PhD researcher at Delft University of Technology. He studies how to design, implement and assess the impact of new business models in the context of a Circular Economy, working on a Horizon 2020 project. In the past, he explored how sustainability objectives can be used as a catalyst for business innovation and investigated factors underlying successful implementation of design projects in emerging markets. He has also been working in Latin America and in Asia on various international development projects related to water and sanitation, sustainable urban mobility and food supply chains.

His contribution to the CAS9 project will come soon as project leader.

Session III: NanoPlastics (NPs)

Julien GIGAULT is a Scientific Researcher (CR) at the CNRS (FR). His main field of interest is the characterization of nanoparticles and their behaviour in the environment, including micro- and nano-plastics, and has over 55 publications in peer-reviewed international scientific journals. He holds a PhD in Analytical and Environmental Chemistry (Université de Pau et des Pays de l'Adour, 2011). He has been a Research Scientist at the National Institute of Standards and Technology (NIST, USA, 2011-2014), at the EPOC Laboratory (CNRS-UMR 5805, 2014-2016) and at the Geosciences Rennes (CNRS-UMR6118, 2016-2020). He is currently a CNRS Research Scientist & Université Laval Associate Professor at TAKUVIK Laboratory (Laval University, Québec, CAN).

His contribution to the CAS6 project is focused on the **set-up of novel analytical approaches for the quantitation and characterisation of nanoplastics in environmental samples.**

Miren P. CAJARAVILLE is a Full Professor of Cell Biology at the University of the Basque Country (UPV/EHU) since 2002 and Principal Researcher in the CBET CRG (ES). Her main field of interest is the study of the health of ecosystems using cellular and molecular approaches, particularly of environmental micro- and nanoplastic marine pollutants, and has more than 140 research articles & reviews in peer-reviewed international scientific journals. She holds a PhD at the University of the Basque Country (1991) and has carried out research stages in several institutions (Universities of Wales, Heidelberg, King's College London, University of California at San Diego and Hong Kong). She has recently received the IKERBASQUE Research Award (October 2021).

Her contribution to the CAS6 project is focused on the **biomonitoring/bioaccumulation methods** (uptake effects, cell/tissue responses, and intracellular fate) **applied for the study of environmental nanoplastics in marine organisms.**

Nicoletta RICCARDI is a Permanent Researcher at the CNR-IRSA (IT) since 2009. Her **main field of interest** is the study of the biodiversity, conservation and environmental toxicology of model organisms in freshwater ecosystems, particularly in the evaluation of anthropogenic impacts, including micro- and nano-plastics, and has over 100 publications in peer-reviewed international scientific journals. She holds a PhD in Biology in Environmental Engineering (Polytechnic University of Milan, 1993). She has been a Research collaborator at the CNR in projects with the JRC (Ispra), the CETA (Gorizia, IT), and the Universities of Genève (CH) and Sud Toulon Var (FR), and she carried out a post-doctorate stage at the University of Venice (IT).

Her **contribution** to the CAS6 project is focused on the **biomonitoring/bioaccumulation methods** (identification of species/populations, detection of toxins in mussel tissues) **applied for the study of environmental nanoplastics in freshwater organisms.**

Ulrich SCHWANEBERG is the Head of the Institute of Biotechnology at the RWTH Aachen University (DE) since 2009 and Member of the Board of Scientific Directors at DWI-Leibniz Institute for Interactive Materials (DE) since 2014. His **main research interest** is to generate a fundamental understanding of protein properties on a molecular level and to use the discovered principles for efficient process development as well as design of interactive materials for a sustainable bioeconomy, including functionalized peptides for micro- and nano-plastics detection, encompassing more than 200 publications in peer reviewed scientific journals. He holds a PhD in Chemistry (1999, University of Stuttgart), has been a postdoctoral researcher at the California Institute of Technology (CalTech, USA), with F. Arnold (Nobel Prize winner 2018 in chemistry), and Professor at the Jacobs University Bremen (DE) between 2002-2008.

His **contribution** to the CAS6 project is focused **on biotechnological approaches to detect and identify nanoplastics by the use of selected poly-peptides as molecular tags capable of selectively binding to the surface of micro(nano)plastic particles in an effective and practical fashion.**

Session IV: Social classes, inequality and the Digital Age

KEYNOTE 1 – Paolo Brunori

“Are exposed tree roots a bad thing? Pros and cons of using machine learning to study social inequalities”

Abstract

Machine learning is transforming the way in which social scientists think and use statistics to do research. This process of transformation first involved scholars working on forecasting, but it has now spread to an astonishing number of research fields, including inequality. This seminar discusses the pros and cons of using machine learning to study socially inherited inequalities. In particular, it focuses on the use of tree-based methods to decompose inequality into within and between social groups. Data from the European Union Statistics on Income and Living Conditions are used to show the nature and depth of horizontal inequalities in Europe.

References Brunori P., Neidöfer G., *The Evolution of Inequality of Opportunity in Germany. A Machine Learning Approach*, REVIEW OF INCOME AND WEALTH, 2021, on line: doi.org/10.1111/roiw.12502.

Brunori P., Hufe P., Mahler D. G., *The Roots of Inequality: Estimating Inequality of Opportunity from Regression Trees and Forests*, IZA DISCUSSION PAPER SERIES, DP No. 14689.

Hothorn T., Hornik K., Zeileis A. *Unbiased Recursive Partitioning: A Conditional Inference Framework*, JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS, 2006, 15:3, 651-674.

Paolo Brunori is an Assistant Professorial Research Fellow at the International Inequalities Institute of the London School of Economics. <http://www.unicaldine.it/>

KEYNOTE 2 – Daniele Quercia

“Computational Social Science for Good”

Abstract

With modern technologies such as smartphones and social media, people are increasingly producing a variety of digital breadcrumbs. We will see how a creative use of these datasets can tackle hitherto unanswered research questions. That is, we will see how to: track people's well-being at scale from aggregate records of food purchases [1]; quantify the cultural capital of neighborhoods from geo-referenced pictures [2]; predict the economic success of cities from online records of "who works where" [3]; profile the psychological resiliency of US regions to COVID-19 from tweets [4]; monitor collective physiological reactions to key social events such as Brexit from wearables [5]; and study neighborhood changes from Airbnb data [6]. We will also discuss the main challenges of translating such computational social science into policies, including transparency, access to data, and algorithmic fairness.

References

[1] Grocery bills can predict diabetes rates by neighborhood <https://goodcitylife.org/food/project.php>

[2] You can now predict London's next gentrification hotspot using social media <https://goodcitylife.org/cultural-analytics/project.php>

[3] US maps of cities with successful startups <http://goodcitylife.org/cities4innovation/>

[4] According to an analysis of tweets, the pandemic has thrown our emotions into a cycle of avoidance, fear, and acceptance <http://social-dynamics.net/EpidemicPsychology/>

[5] Brexit and Trump votes screwed with our heart rates for months <https://www.newscientist.com/article/2167883-brexit-and-trump-votes-screwed-with-our-heart-rates-for-months/>

[6] Airbnb is booming in London <https://www.wired.co.uk/article/airbnb-growth-london-housing-data-insideairbnb>

Daniele Quercia is Department Head of Social Dynamics at Nokia Bell Labs Cambridge (UK) and Professor of Urban Informatics at the Center for Urban Science and Progress (CUSP) at King's College London. He has been named one of Fortune magazine's 2014 Data All-Stars, and spoke about “happy maps” at TED. He was Research Scientist at Yahoo Labs, a Horizon senior researcher at the University of Cambridge, and Postdoctoral Associate at the department of Urban Studies and Planning at MIT. He received his PhD from UC London. <https://researchswinger.org/>